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Renewable Resources
Forest Health Management

Denver, Colorado

Forest Insect and Disease Conditions in the Rocky Mountain Region 1992

FOREST INSECT AND DISEASE CONDITIONS

IN THE

ROCKY MOUNTAIN REGION

1992

By

Forest Health Management Group

Edited by

William H. Blunt, Forest Health Monitoring Coordinator

June 1993

Renewable Resources, Forest Health Management
Rocky Mountain Region
USDA Forest Service
P.O. Box 25127
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ROCKY MT. FOREST & RANGE
EXPERIMENT STATION

ACKNOWLEDGEMENTS

The Forest Health Management (FHM) Staff of the Renewable Resources Unit extends appreciation to all cooperators who contributed to this report.

Information on specific pest problems may be obtained from the Regional Office (303 236-9519), Lakewood Service Center (303 236-9541), Gunnison Service Center (303 641-0471), or Rapid City Service Center (605 394-1960), as well as from the following State Foresters:

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1100 West 22nd Street
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COVER: House wren, *Troglodytes aedon*, with an insect larva in its beak.
Aspen tree killed by sooty bark canker, originally used by a member of the woodpecker family (cavity nester). The cavity is now occupied by a house wren. Ecosystem management requires an increased awareness of the beneficial aspects of insects and disease, as well as the detrimental or negative effects. A variety of birds, mammals, amphibians and reptiles serve as a means of natural control for insect species.

PHOTOGRAPHER: Sue Blunt- Denver, Colorado

MAILING LIST UPDATE - Annual Report 1992

Annually, we update our mailing list of all cooperators. Please assist us with this process. Complete this form and return to:

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USDA Forest Service
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Name and address, if changed:

I would like to receive the following publications: (Check which mailing you wish to receive)

☐ Entomology (Evaluations and Technical Reports)

☐ Pathology (Evaluations and Technical Reports)

☐ Annual Reports (only)

☐ All FHM Reports

NOTE:

As of July 1, 1993, the Regional office is moving to a new location. The following addresses will apply at that time.

P.O. Box Mailing Address:

Renewable Resources - FHM
Rocky Mountain Region
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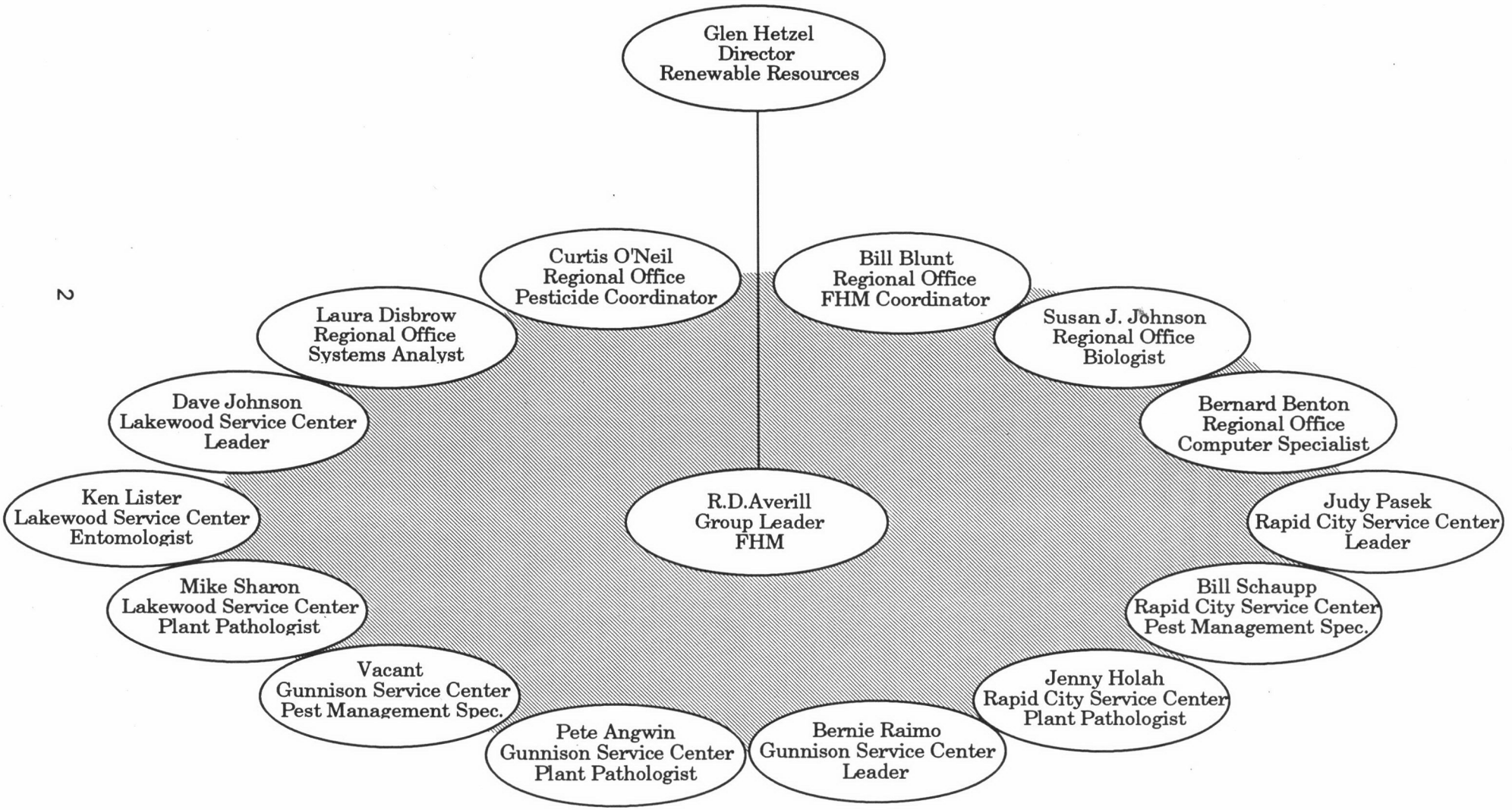
INTRODUCTION

Forest Health Management (FHM) is responsible for the detection, evaluation, and suppression of insects and diseases on forested Federal lands. FHM also administers financial and technical assistance programs with the State Foresters of Colorado, Kansas, Nebraska, South Dakota, and Wyoming. In addition, the management of Gypsy Moth is a shared responsibility with the Animal Plant Health Inspection Service (APHIS). APHIS also has the responsibility for the range pest management programs on Federal lands. Close coordination and cooperation of the Federal and State Agencies responsible for pest management is necessary as several land ownerships are involved.

FOREST HEALTH MANAGEMENT ORGANIZATION

Rocky Mountain Region



FOREST HEALTH MANAGEMENT SERVICE CENTERS

Three Service Centers serve the Rocky Mountain Region. These were established to provide timely and effective pest management services to their customers. Questions concerning Center operations and requests for service can be directed to the Group Leader, FHM, in the Regional Office or the respective Service Center Leaders.

The **Lakewood Service Center** in Building 20 on the Denver Federal Center provides assistance to Kansas, eastern and northwestern Colorado, and southern Wyoming. This includes the following National Forests and cooperators in adjacent areas:

Pike & San Isabel
Arapaho & Roosevelt
Routt
Medicine Bow

Dave Johnson, Supervisory Plant Pathologist, serves as the Service Center Leader. Ken Lister and Mike Sharon are the Center's Entomologist and Plant Pathologist, respectively.

The **Gunnison Service Center** is located at 216 North Colorado, Gunnison, Colorado 81230. It provides assistance to the following National Forests and cooperators west of the Continental Divide in Colorado:

Rio Grande
San Juan
Grand Mesa, Uncompahgre and Gunnison
White River

Bernie Raimo is Supervisory Entomologist and Service Center Leader and Pete Angwin is the Center's Plant Pathologist. An additional pest specialist is scheduled to be added when funding is available.

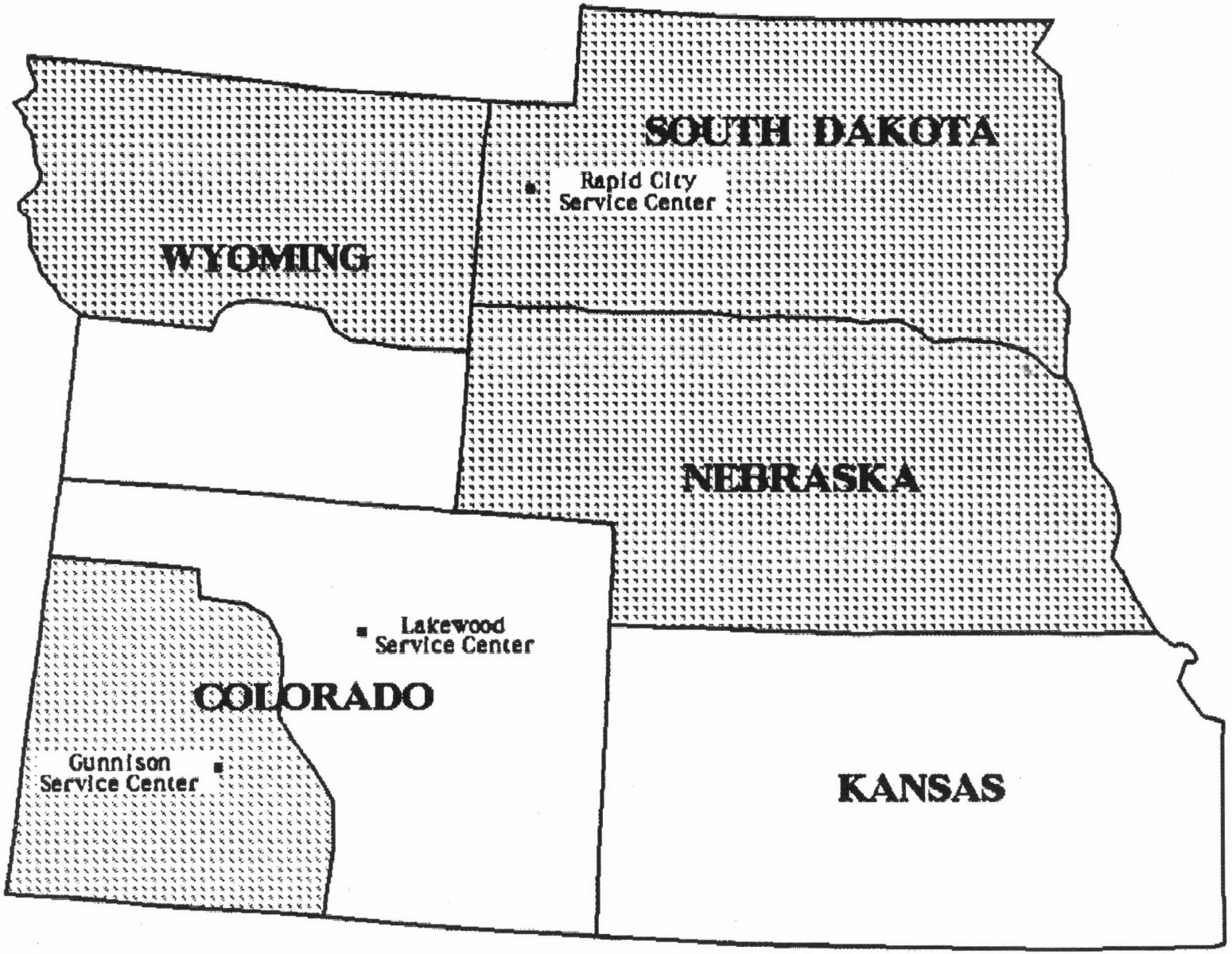
The **Rapid City Service Center** is co-located with the Rocky Mountain Forest and Range Experiment Station at the Forestry Sciences Lab, South Dakota School of Mines and Technology, 501 E. St. Joe, Rapid City, South Dakota 57701. The Service Center provides assistance to the following National Forests and cooperators east of the Continental Divide in northern Wyoming, and in South Dakota and Nebraska within Region 2:

Black Hills
Bighorn
Shoshone
Nebraska

Judith Pasek is Supervisory Entomologist and Service Center Leader, Bill Schaupp is the Center's Pest Management Specialist and Jenny Holah is the Plant Pathologist.

See Figure 1.

ROCKY MOUNTAIN REGION
Forest Health Management Zones



FOREST HEALTH MANAGEMENT WORKSHOPS AND TRAINING

Tree Health Management Series

Several workshops and one exhibit presentation were held in FY 92. National interest in hazard tree evaluation is escalating. The strongest interest continues to be within urban forestry, while efforts on National Forests are less active.

More than 474 people in private practice or working for cities or state agencies and the Department of Interior learned about risk, reason, and common sense in evaluating trees for hazard. The program was exhibited at the International Society of Arboriculture Conference in Oakland, California. Presentation of the program at the the National Arbor Day Foundation Institute continues to draw people from around the country. A special workshop was presented at Acadia National Park as a result of a request from State and Private Forestry and the Northeastern Area. Acadia joined the ranks of National Parks that are conscientiously making an effort to sensitize and educate their personnel in hazard tree management.

A 2-day insect and disease recognition and management training session was held at Steamboat Springs, Colorado, in early June. Recognition, management, and treatment of major forest pests in Region 2 were emphasized. Twenty-two participants were instructed by personnel from the three Forest Health Management Zone offices.

INTERNATIONAL FORESTRY

The United States is recognized for its expertise in the field of forest insect and disease technology. It is currently participating, with other countries as a part of the global community, in providing a variety of environmentally acceptable approaches for control of insects and disease. This includes the sharing of technology through exchange of information and/or people, as well as trips to or from various countries to observe firsthand, a variety of techniques being used to control insects and disease throughout the world.

Forest Pest Management Tour of the People's Republic of China

In 1992, a Joint Statement on Forest Health Protection between The Ministry of Forestry, People's Republic of China, and the Forest Service, United States Department of Agriculture, was executed for a 5-year period.

As a result of this technology exchange agreement, a delegation of U.S. Forest Service, Forest Pest Management personnel were invited to tour the People's Republic of China (PRC). Bernie Raimo, Gunnison Service Center Leader, was a member of this group. The primary purposes of the delegation's visit were:

1. To identify areas of focus for future exchanges between the Forest Service and China's Ministry of Forestry.
2. To identify individuals in the PRC and U.S. who could exchange knowledge and technology.
3. To identify opportunities where replicated research between the two countries may be conducted.

The tour began at the Research Institute of Forestry, Chinese Academy of Forestry in Beijing and progressed through several provinces and counties. A variety of insect and disease control problems and control techniques were shared with the participants. Some of the major discussion subjects were:

1. Parasites/predators of the gypsy moth in China.
2. Microbial control of forest insects in China.
3. Remote sensing, computer applications, and information management.
4. Integrated management of the pine caterpillar, *Dendrolimus punctatus*.
5. Pine shoot beetle, *Tomicus piniperda*, problem in Yunnan Province.
6. Results of *Tomicus piniperda* control.

Aphids In Africa

The U.S. Forest Service was requested to assist the International Institute of Biological Control (IIBC) in a study on the insect natural enemies of North American *Cinara* aphids. An outbreak of the cypress aphid, *Cinara cupressi* Buckton (Homoptera, Aphididae), an introduced pest of Cupressaceae in Africa, has resulted in an International effort to develop suitable biological control techniques for its management. Several other aphids are also becoming a problem. Annual growth loss in cypress, by *Cinara* alone, has been estimated at seventeen and a half million dollars to the countries affected. The cypress tree is used for ornamentals, building material, fire fuel (controlled), as well as living fences. In the country of Kenya, the potential loss in cypress is equivalent to one billion dollars in U.S. currency.

Bob Averill, Group Leader FHM, and Dan Kucera, Entomololologist, Northeastern Area, visited the International Institute of Biological Control in England to become acquainted with the international protocols associated with biological control. Surveys were made in southwest England to become familiar with the aphids' biology, and ecology in England. They also visited the IIBC lab in Delemont, Switzerland, where the majority of the coordination for the International effort in biological control of noxious weeds is initiated. Their visit was completed with a trip to the Food and Agricultural Organization (FAO) headquarters in Rome to be briefed on the African aphid project goals. Shaun Murphy with IIBC in London arrived in Colorado in late June to learn about the biology and ecology of *Cinara* species in Colorado and to initiate parasite collections for shipment to England.

Surveys throughout North America to find suitable parasites resulted in determining that Colorado may provide the best possible candidate parasite species for eventual introduction into Africa. Curtis O'Neil, entomologist in the Regional Office in Region 2, is in charge of the collection activity in Colorado. Parasitized aphids that were mummified and those appearing to have the potential to become mummified were shipped to IIBC in England. Seven shipments of about 100 parasitized aphids were sent to England during the July to October period. Successful host search and oviposition was attained by two of the four species of parasites. Male progeny emerged from successful oviposition by one of the species. Further screening and rearing of parasites will be done with the eventual goal of establishing one or more species in Kenya to help control the aphid problem. Collection of specimens is scheduled to continue in Colorado during the summer of 1993.

FIGURES

Ecosystem management requires an increased sensitivity to the total landscape and the many relationships that make up the systems. The challenge is to interpret and predict what may occur as a result of a particular management decision. This long term "forecasting" has many implications. To meet obligations on addressing vegetation diversity or the habitat needs of a variety of insect species, we must know what species are present or the probability of their occurrence. We must also know what vegetation cover types are present and what long-term changes are likely to occur as a result of a management decision. The information used to prepare the following figures was taken from the *Inventory of Colorado, Wyoming, South Dakota, and Nebraska National Forest System Lands Administered by Region 2, Book 1, Regional and State Totals By Forest Type and Standsize(1987).*

Figure 1

Knowledge of conditions or habitat requirements that are necessary for insects and/or disease requires information on a variety of factors, including cover types, size or age classes and history of these types. Figure 1 shows the mix and percentage of cover types in Region 2 as of 1985.

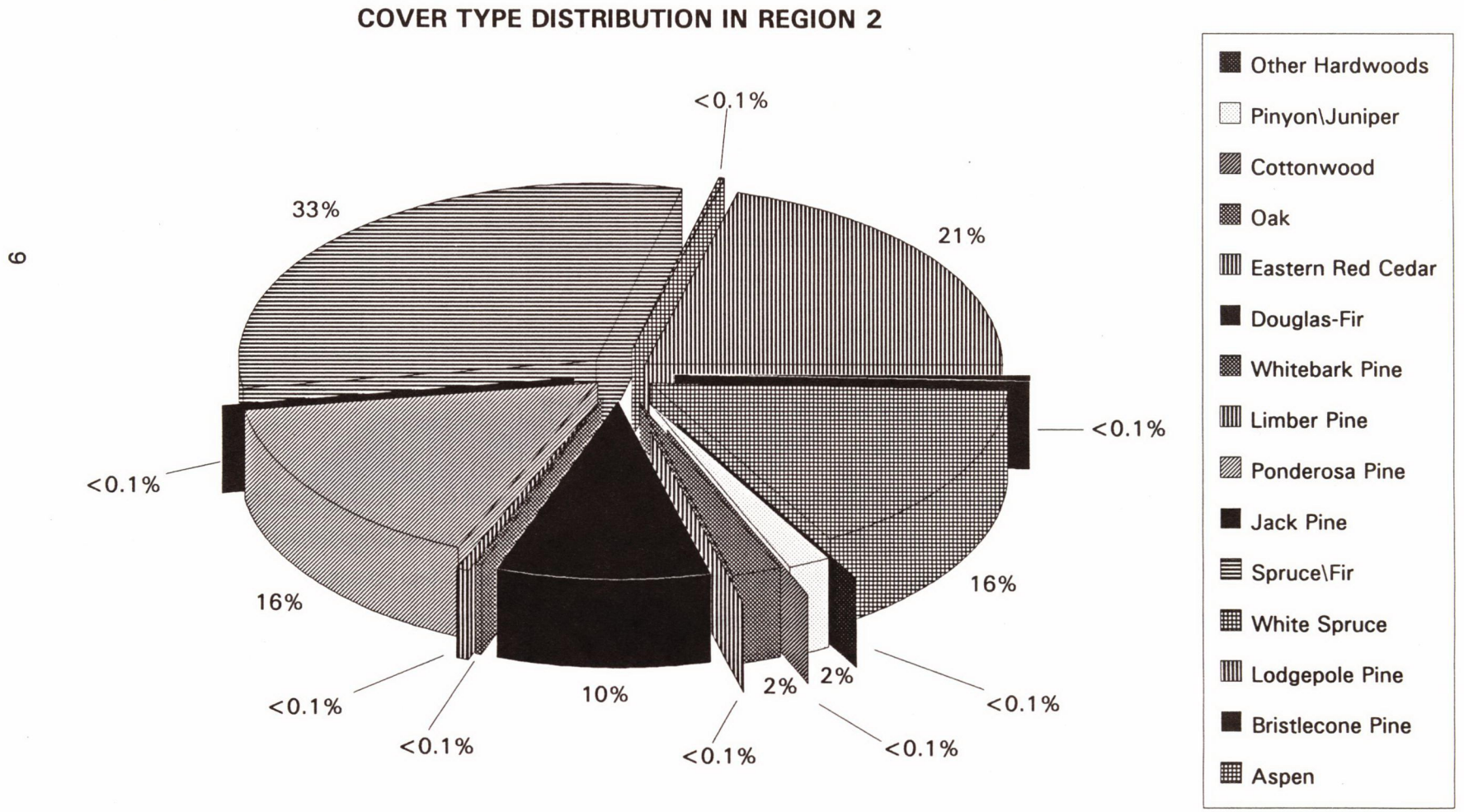


Figure 2

Figures 2 through 11 show acreages of cover types by diameter classes. They illustrate that in Region 2 cover types there are more trees of a diameter greater than 9 inches than there is of a diameter less than 9 inches. This is indicative of past management practices, including fire, timber harvest and insect and disease treatment. These trees and stands may occur in a variety of situations such as steep hillsides, areas of concentrated public use, wilderness, as well as in or adjacent to subdivisions, metropolitan areas, or recreation sites. The acreage of larger diameter trees reflects the relative magnitude for potential major outbreaks of tree killing insects and disease. This increases the challenge of managing forest cover types to meet a desired future condition.

SPRUCE-FIR DIAMETER CLASSES

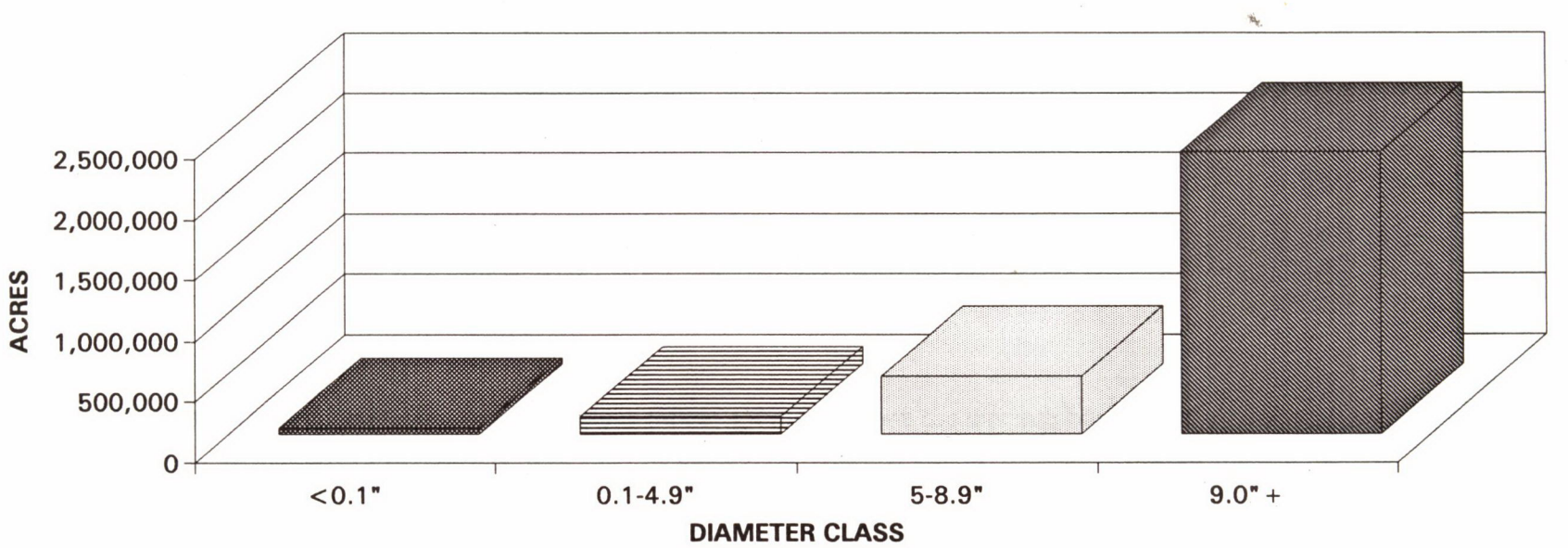


Figure 3

PONDEROSA PINE DIAMETER CLASSES

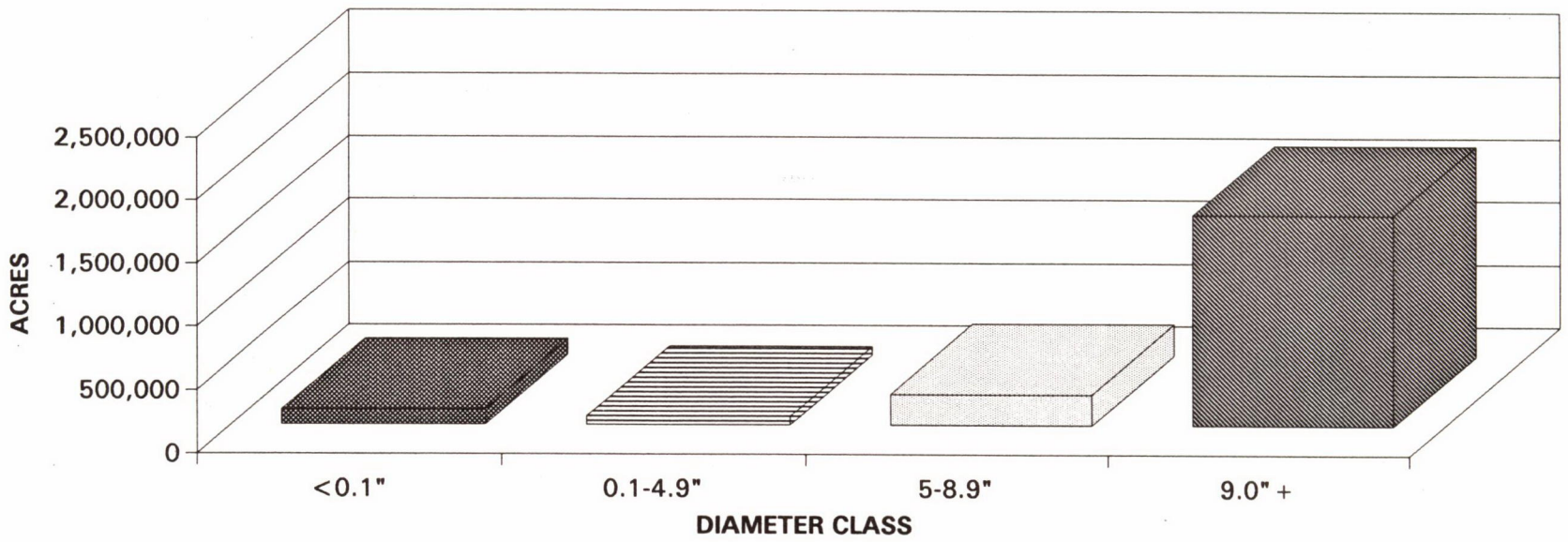


Figure 4

LODGEPOLE PINE DIAMETER CLASSES

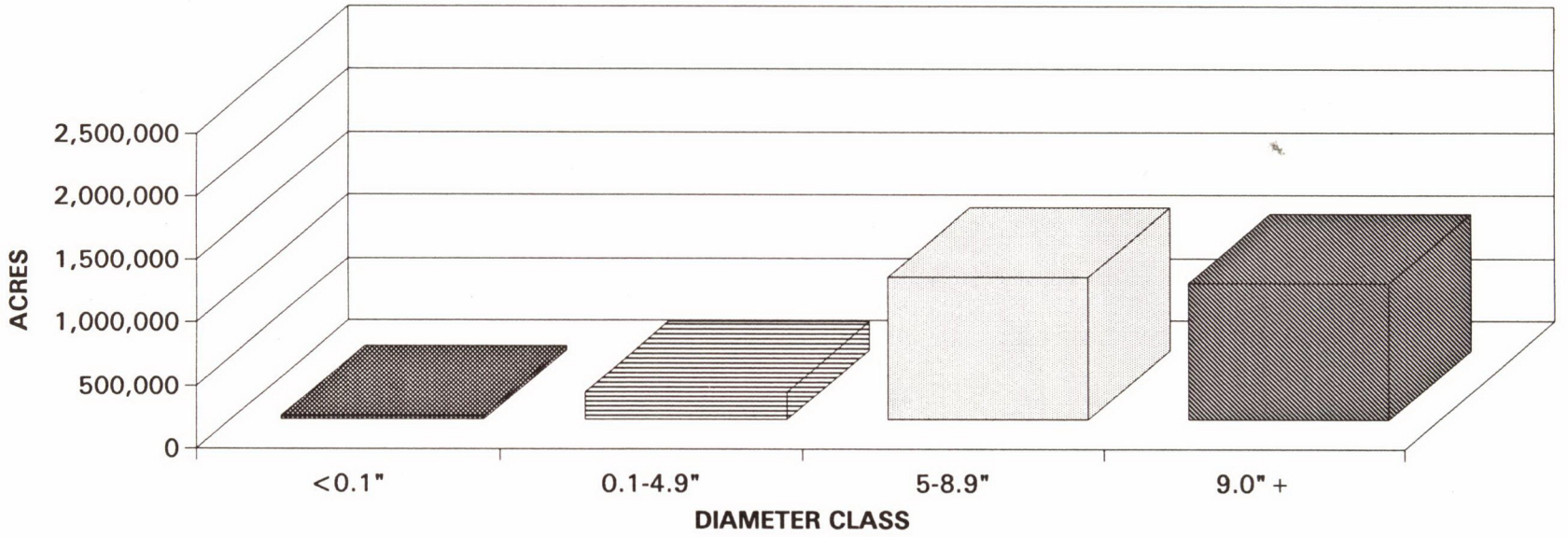


Figure 5

DOUGLAS-FIR DIAMETER CLASS

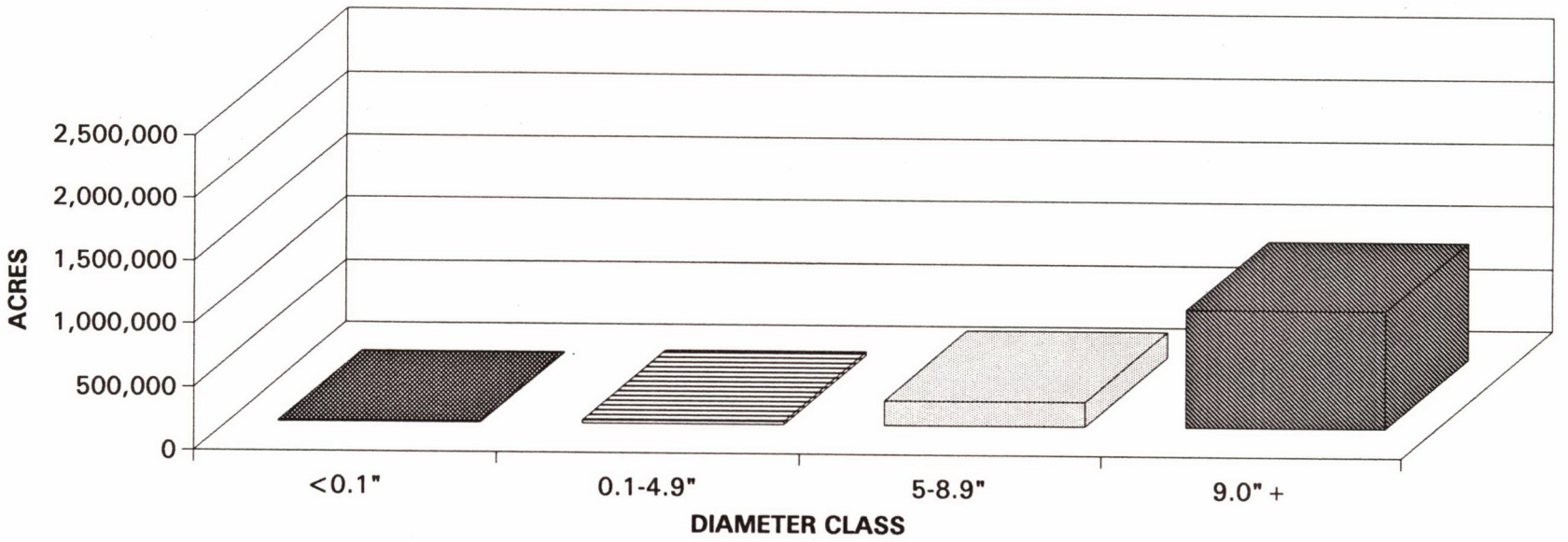


Figure 6

ASPEN DIAMETER CLASSES

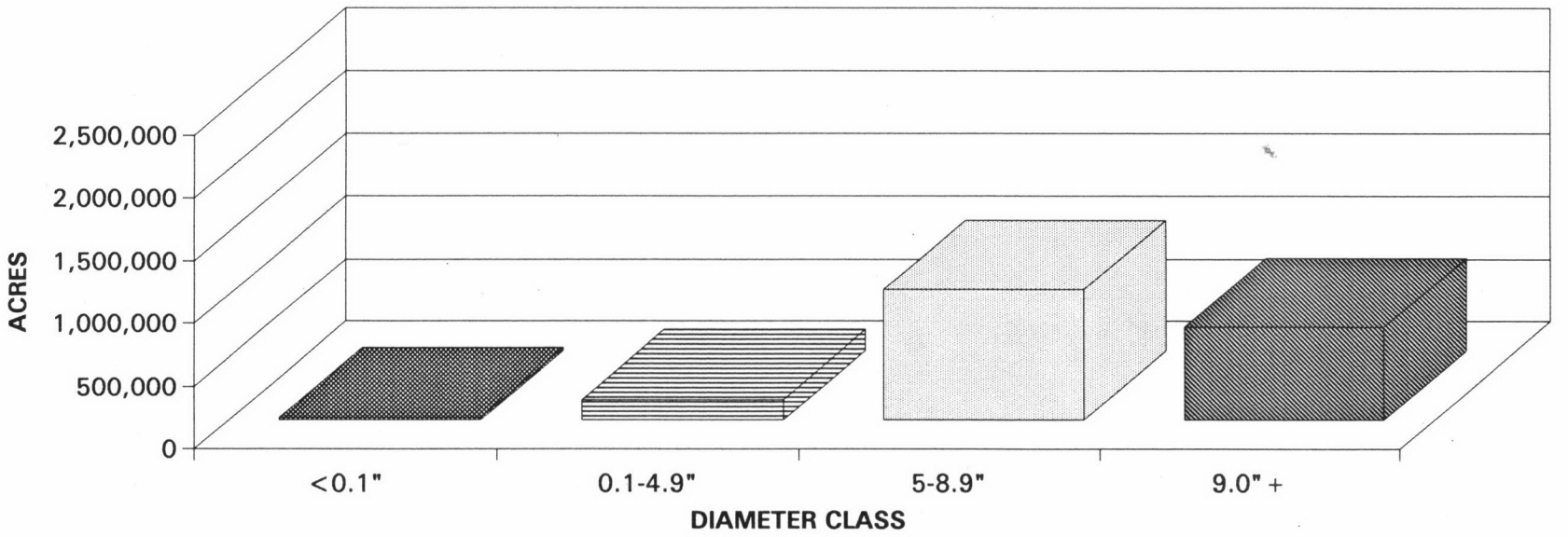


Figure 7

LIMBER PINE DIAMETER CLASSES

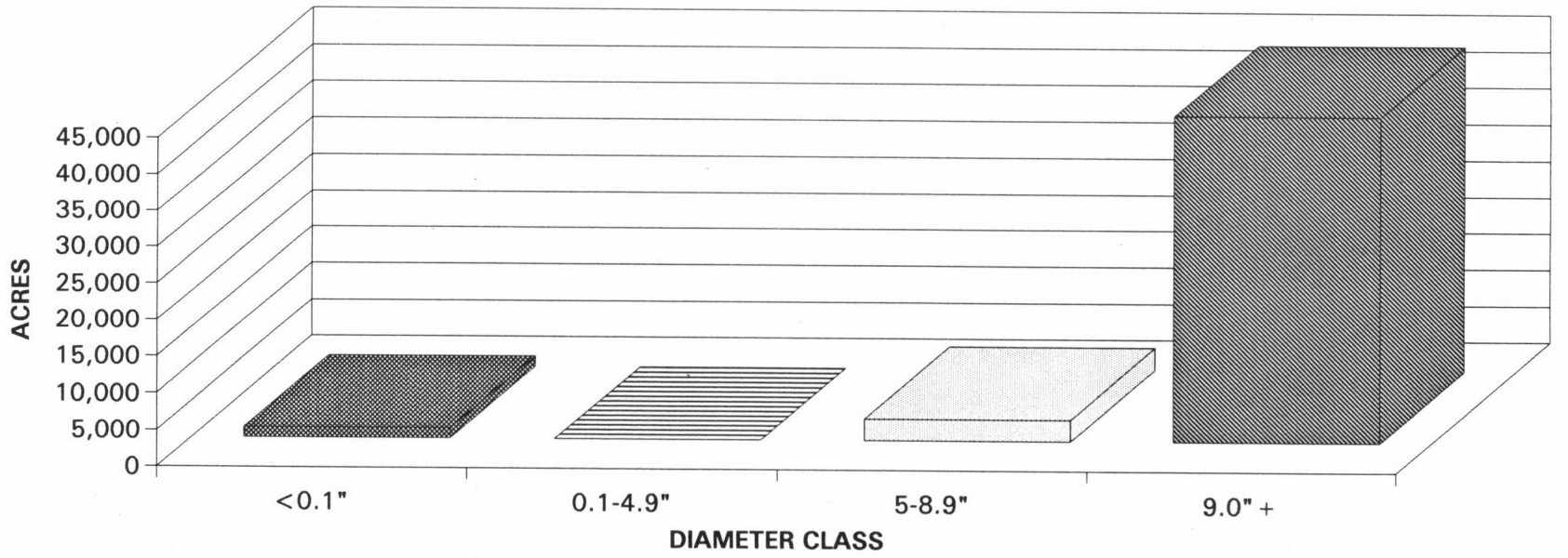


Figure 8

WHITEBARK PINE CLASSES

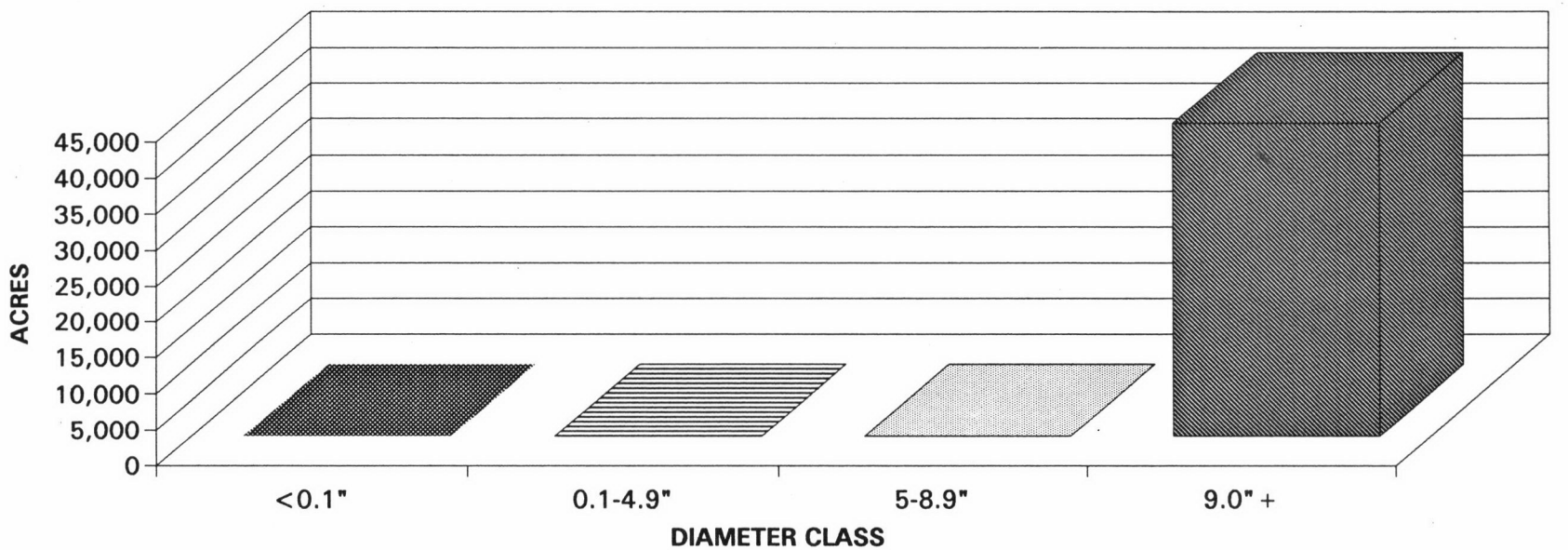


Figure 9

BRISTLECONE PINE DIAMETER CLASSES

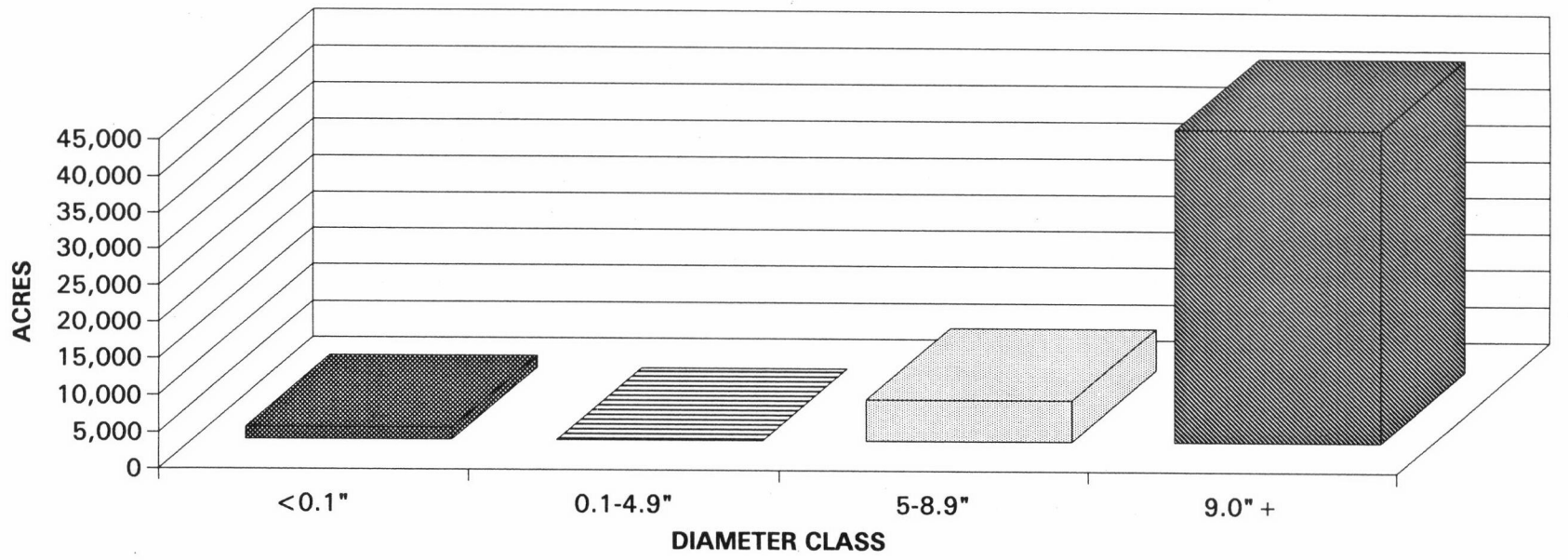


Figure 10

WHITE SPRUCE DIAMETER CLASSES

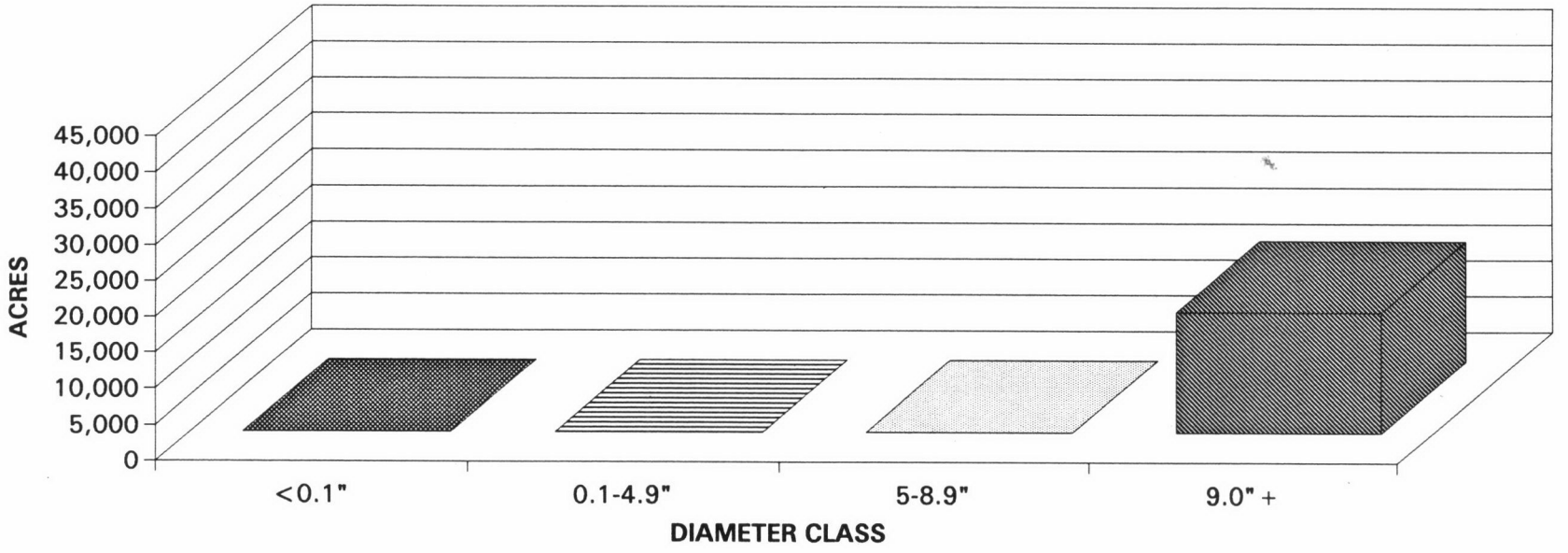


Figure 11

JACK PINE CLASSES

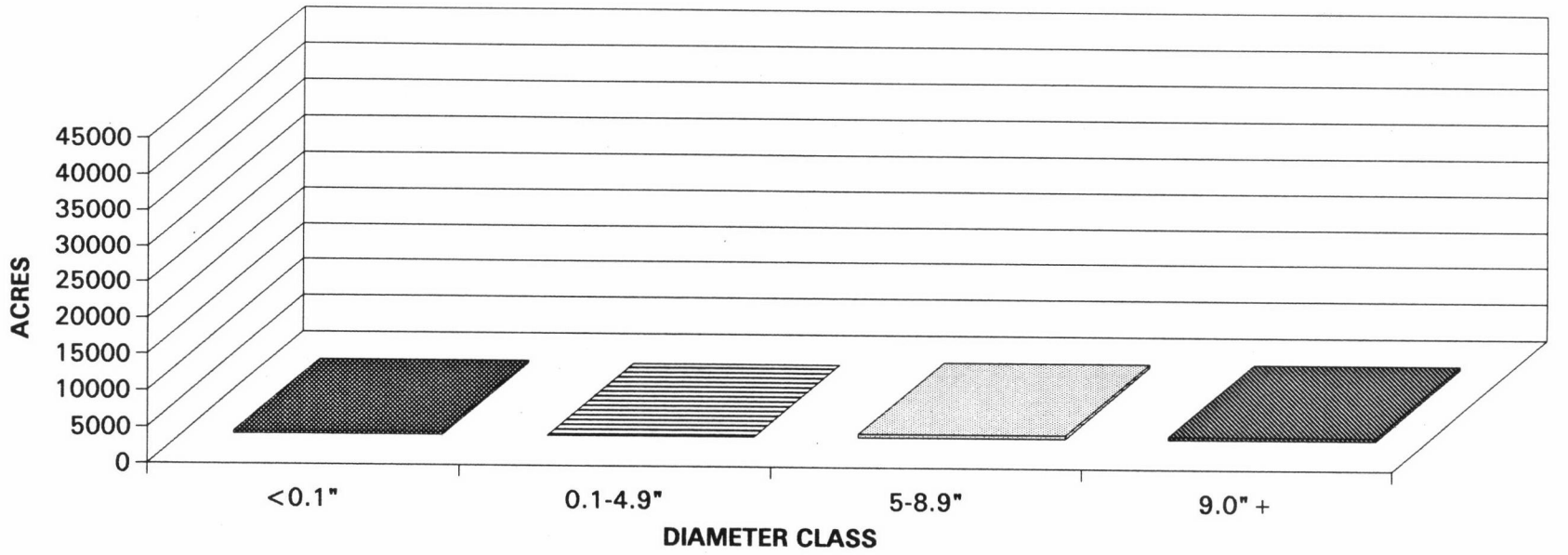


Figure 12

Twenty-three percent of the spruce-fir cover type in Region 2 is of an age class that is vulnerable to dramatic insect and disease activity. Age class is one of several considerations in addressing desired future condition and evaluating alternatives for management areas in forest plan revisions.

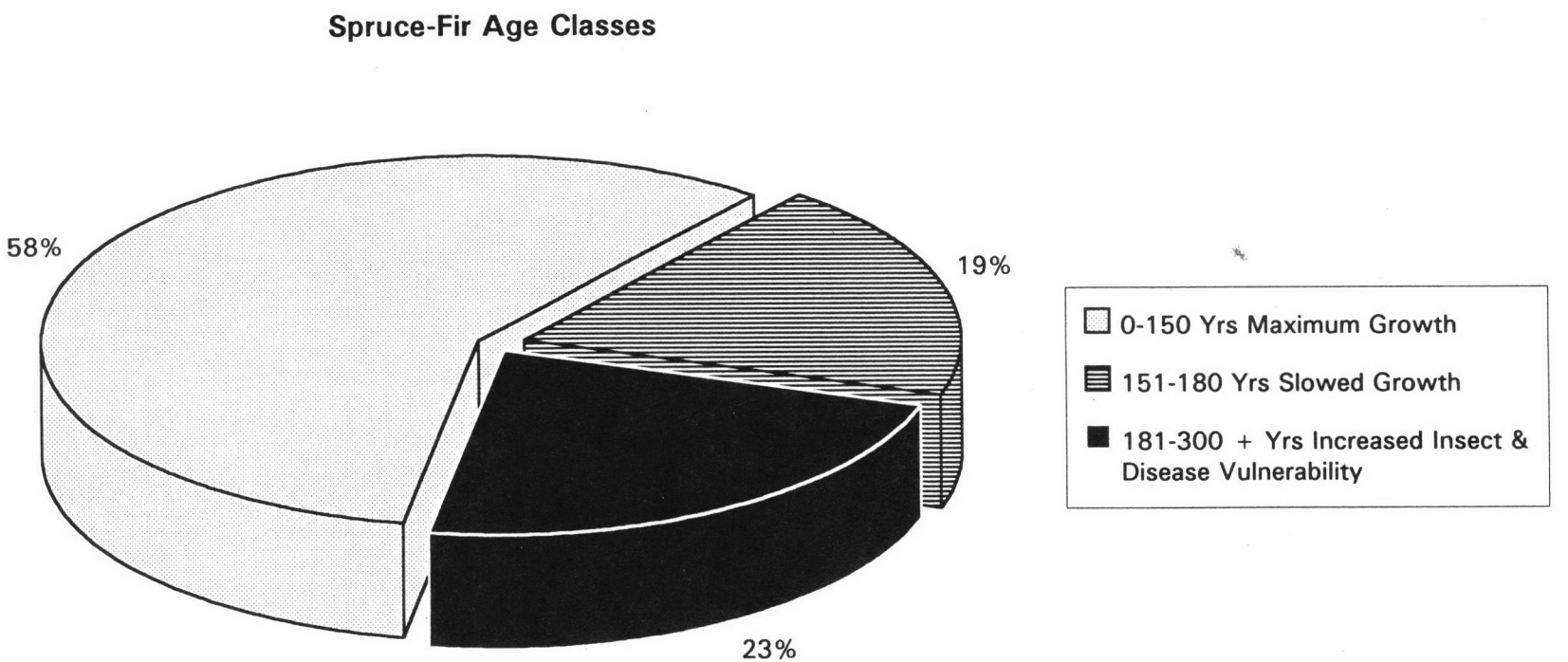


Figure 13

Six percent of the ponderosa pine cover type in Region 2 is of an age class that is vulnerable to dramatic insect and disease activity. Age class is one of several considerations in addressing desired future condition and evaluating alternatives for management areas in forest plan revisions.

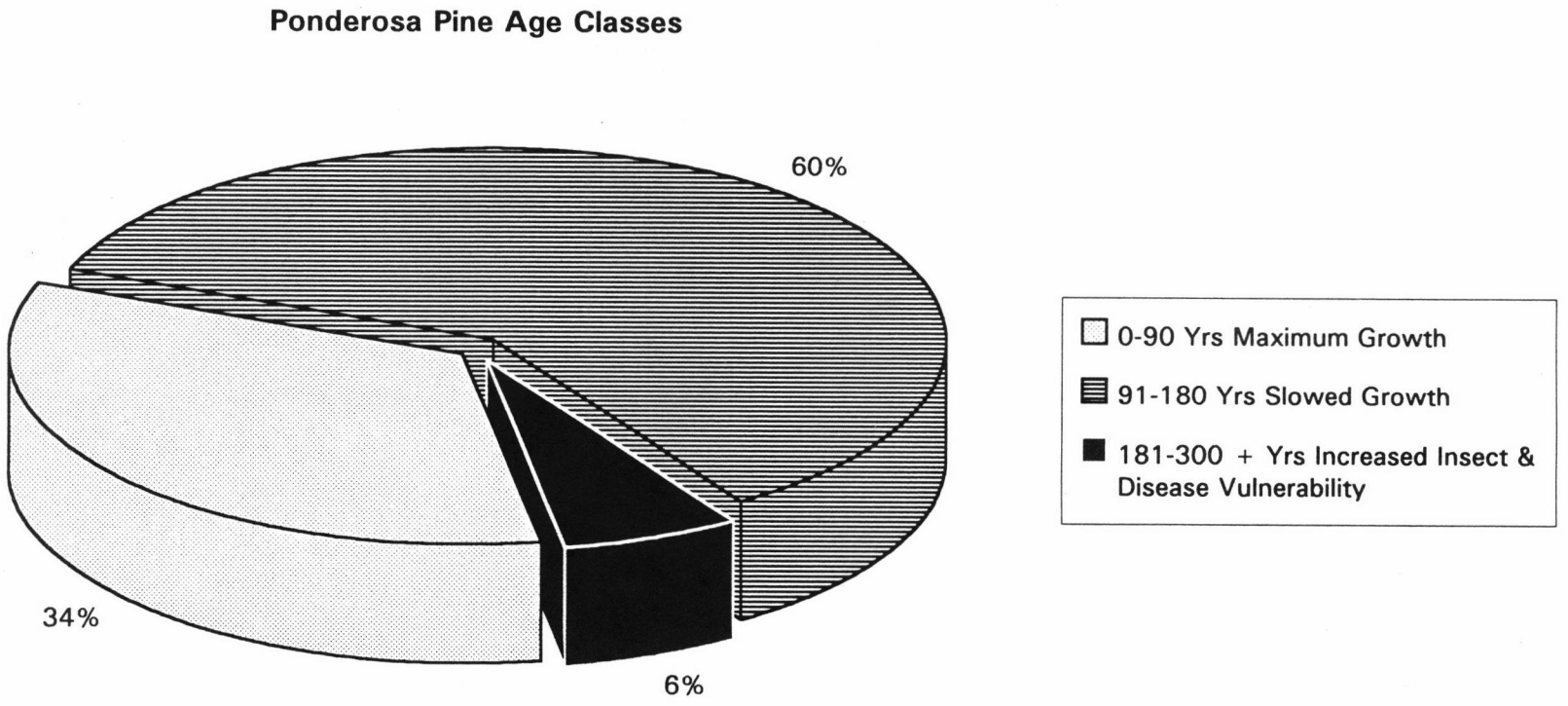


Figure 14

Twenty-five percent of the lodgepole pine cover type in Region 2 is of an age class that is vulnerable to dramatic insect and disease activity. Age class is one of several considerations in addressing desired future condition and evaluating alternatives for management areas in forest plan revisions.

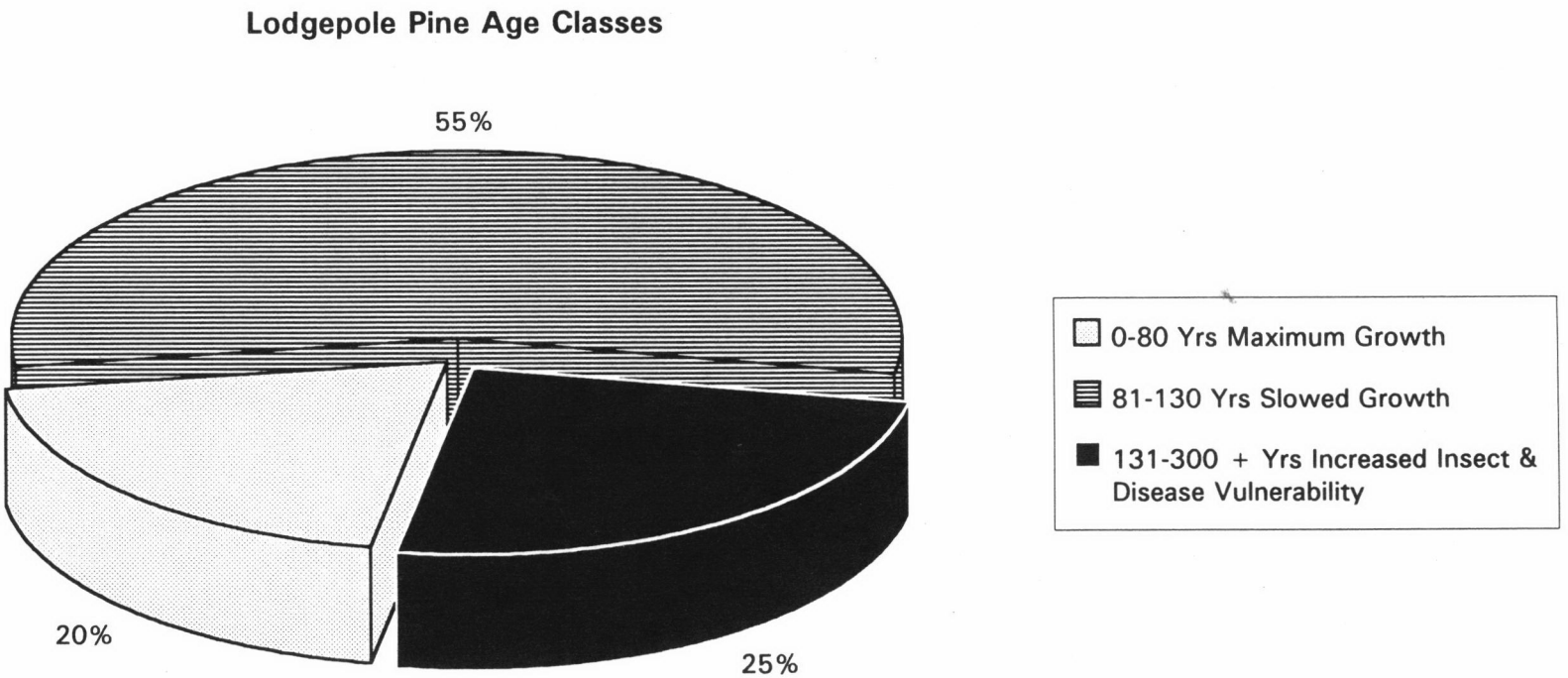


Figure 15

Thirty-five percent of the douglas-fir cover type in Region 2 is of and age class that is vulnerable to dramatic insect and disease activity. Age class is one of several considerations in addressing desired future condition and evaluating alternatives for management areas in forest plan revisions.

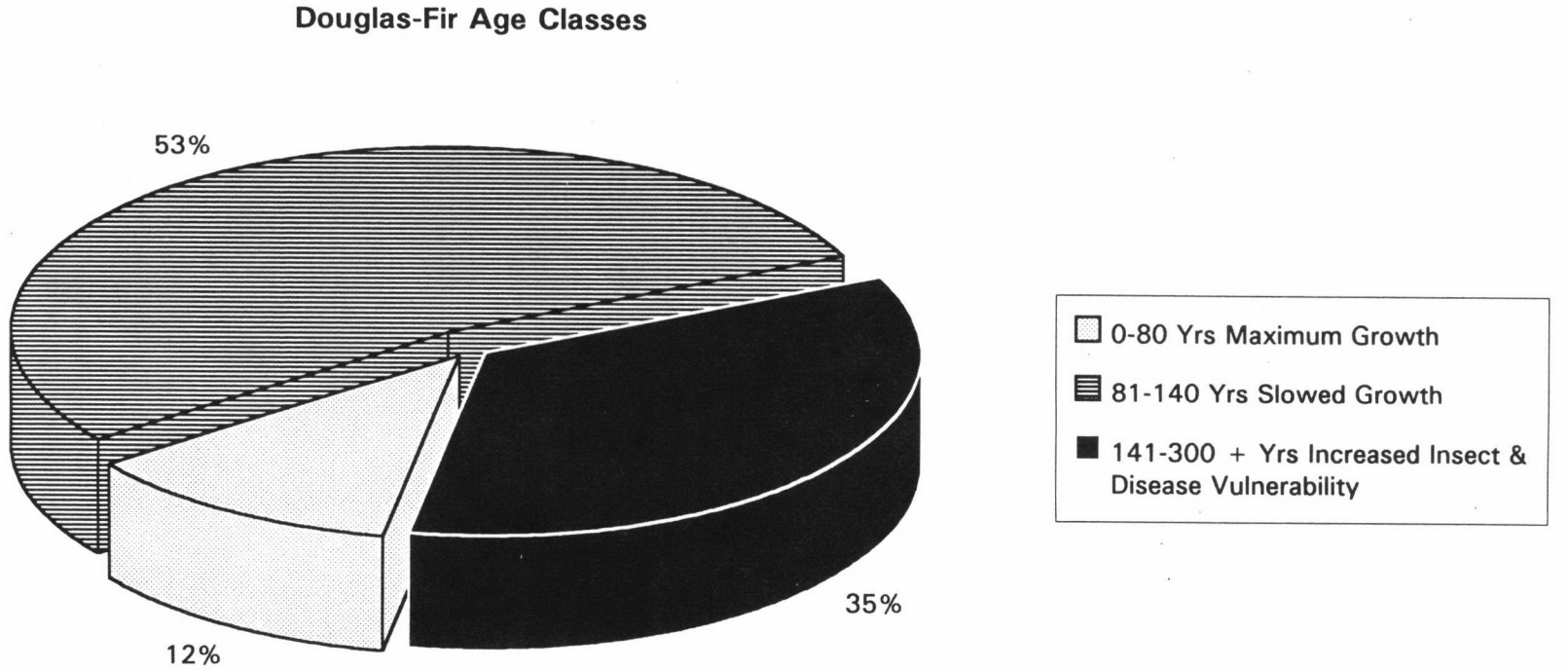
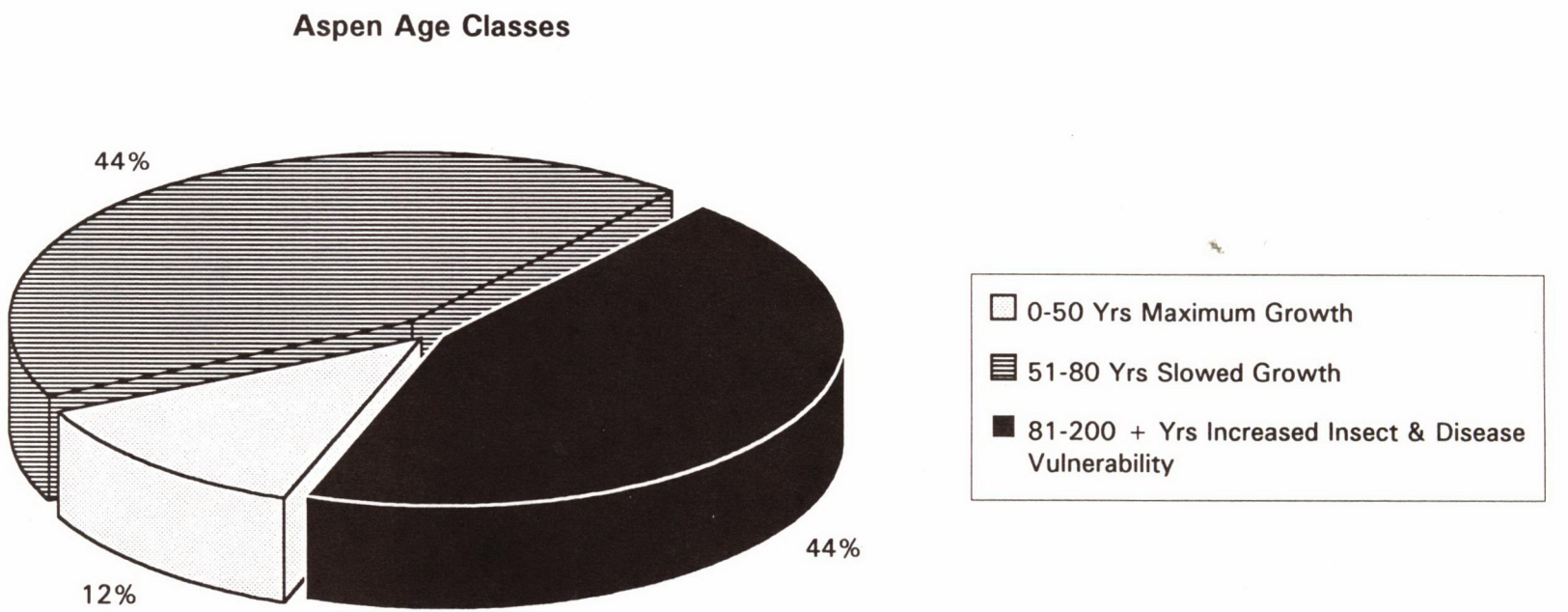


Figure 16

Forty-four percent of the aspen cover type in Region 2 is of an age class that is vulnerable in dramatic insect and disease activity. Age class is one of several considerations in addressing desired future condition and evaluating alternatives for management areas in forest plan revisions.



SUMMARY OF INSECT AND DISEASE CONDITIONS

INSECTS

Douglas-fir beetle *Dendroctonus pseudotsugae Hopkins*

Mortality along the Colorado Front Range is still occurring in small, widely scattered groups. Most of the mortality is on steep inaccessible slopes where western spruce budworm has defoliated trees during the past 10 years. Douglas-fir beetle activity continued to increase and spread on the Clarks Fork Ranger District of the Shoshone National Forest in Wyoming. This is expected to continue into 1993.

Gypsy moth *Lymantria dispar*

Surveys continued statewide on private land in Colorado. Four moths were caught in 1992: one at Royal Gorge, one in Boulder, and two in Longmont. Moths were caught at three sites in Kansas: one in the Kansas City Area, two near Salina, and one at a truck stop in Salina. Nebraska trapping caught 15 adjacent to Fuccio's Nursery in Irvington and one at Yan's Nursery. Single moth catches were reported from Ralston and Bellevue. Single moth catches were also reported from Beatrice and North Platte. In South Dakota, seven moths were caught south of Rapid City near Rockerville.

Mountain pine beetle *Dendroctonus ponderosae*

A small infestation was discovered in lodgepole pine near Lake Granby on the Arapaho National Forest. Areas which experienced fairly high populations during the late 1980's and early 1990's continue to decline while supporting low level populations. Tree mortality increased significantly in the central Black Hills of South Dakota. The epidemic near Bear Mountain spread to the south. Mortality of limber pine continued in Tensleep Canyon on the Bighorn National Forest in Wyoming, while the outbreak in ponderosa pine at Laramie Peak decreased in 1992.

Western spruce budworm *Choristoneura occidentalis*

Defoliation occurred on approximately 262,000 acres of mixed conifer and subalpine forests on the San Isabel, Rio Grande, Gunnison, and White River National Forests, as well as private land in Gunnison County, Colorado. This activity is expected to continue into 1993. Areas along the Front Range and adjacent intermingled state and private lands experienced moderate defoliation. In Wyoming, areas near Sunlight Basin on the Shoshone National Forest near Lander were lightly defoliated in 1992.

STEM AND BRANCH DISEASES

Comandra blister rust *Cronartium comandrae*

The disease is present in northern Colorado and western South Dakota but causes no significant damage. Comandra blister rust continues as one of the major diseases on the Bighorn and Medicine Bow National Forests in Wyoming. Scattered damage occurred in older lodgepole pine stands on the Shoshone National Forest.

Dwarf mistletoe *Arceuthobium americanum*

Dwarf mistletoes cause the greatest disease losses in Region 2. Fifty percent of the lodgepole pine type is infected. It is widespread in some areas of the Bighorn National Forest, though not yet a management concern.

CANKER DISEASES

Cytospora canker *Cytospora* spp.

Cytospora canker is common on aspen throughout Colorado where it is a management concern in campgrounds and regeneration areas. It is widespread on aspen in the Black Hills, usually on trees weakened by other diseases and/or insects. This was probably the worst year ever for Cytospora canker in western Kansas.

ROOT DISEASES

Annosus root disease *Heterobasidion annosum*

Annosus root disease was reported as a factor affecting management of mixed conifer stands on the Southern Ute Reservation and white fir in the Amphitheater Campground on the Uncompahgre National Forest. The disease was also noted in the spruce/fir stands at the North Cone and Truby Complex Timber Sale Areas on the Uncompahgre and San Juan National Forests in Colorado.

Armillaria root disease *Armillaria* spp.

Armillaria root disease is the most common root disease in Colorado. The disease is affecting management of mixed conifer stands on the Southern Ute Reservation and is present in the spruce/fir stands at the North Cone and Truby Complex Timber Sale Areas on the Uncompahgre and San Juan National Forests, and also in the Willow Peak and Grizzly Lake areas of the Flat Tops on the White River National Forest. The disease was also identified as a major problem in the spruce/fir leave strips at the Aspen Mountain ski area. In South Dakota, this root disease continues to cause mortality of spruce and ponderosa pine on the Black Hills National Forest. Large volume losses and poor regeneration of ponderosa pine are occurring in the northern Black Hills.

FOLIAGE DISEASES

Moderate to low occurrence of several foliage diseases of aspen caused aesthetic concern but little permanent damage to host trees in Colorado. Dothistroma needle blight on Austrian and ponderosa pine was moderate to severe in eastern Kansas. Diplodia blight of ponderosa pine appeared higher in the Black Hills of South Dakota than in recent years.

VASCULAR WILTS AND DECLINES

Dutch elm disease *Ceratocytis ulmi*

Dutch elm disease was down in Colorado in 1992. It is still a serious problem in many Kansas urban areas.

ABIOTIC

Chemical damage

Damage from accidental herbicide application to windbreaks and other tree plantings continues to be a concern throughout the Region.

Winter drying injury

Winter flecking on easternmost natural populations of ponderosa pine was present in South Dakota. Widespread needle damage in lodgepole pine occurred on the Bighorn National Forest in Wyoming.

Winter injury

Significant losses (more than one million trees) of hardwoods, pine, and cedar occurred in metropolitan and urban areas of eastern Colorado and southern Wyoming due to low temperatures before trees hardened-off. Cold injury was evident in many trees in the western half of Kansas.

OTHER

Sprout dieback

Regeneration failure and dieback of aspen occurred on the Grand Mesa, Uncompahgre, Gunnison, San Juan, and Routt National Forests.

ROCKY MOUNTAIN REGION INSECTS

Prepared by William H. Blunt

INSECT	HOST	LOCATION	REMARKS
A willow sawfly *Nematus* sp.	Willow	Wyoming	No significant activity reported in 1992.
Ash plant bug *Tropidosteptes amoenus*	Green ash	South Dakota	No significant activity reported in 1992.
Aspen leaf beetle *Chrysomela crotchi*	Aspen	South Dakota	Defoliation not evident in 1992.
Balsam twig aphid *Mindarus abietinus*	Balsam fir	South Dakota	No significant activity reported in 1992.
Birch skeletonizer *Bucculatrix canadensisella*	Birch	South Dakota	Defoliation not evident in 1992.
Blackheaded ash sawfly *Tethida cordigera*	Green ash	South Dakota	No significant activity reported in 1992.
Bronze birch borer *Agrilus anxius*	Paper birch	South Dakota	No significant activity reported in 1992.
Brown-headed ash sawfly *Tomostethusm ulticinctus*	Green ash	Colorado	Appears to be increasing its range within Colorado and is causing significant defoliation of ornamentals in south central Colorado.
Bull pine sawflies *Zadiprion townsendi*	Ponderosa pine	Colorado	Defoliated individual trees along the Front Range in Colorado from north of Colorado Springs to Fort Collins.
Cankerworms *Alsophila pometaria* *Paleacrita vernata*	Bur oak	South Dakota, Wyoming	Defoliation declined from 1991.
Common falsepit scale *Lecanodiaspis prosopidis*	Green ash, Hackberry, Red Mulberry	Colorado	No significant activity was observed in 1992

Rocky Mountain Region-Status of Insects in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

INSECT	HOST	LOCATION	REMARKS
Cottonwood borer *Plectrodera scalator*	Cottonwood	South Dakota	No significant activity reported in 1992.
Dioryctria moths *Dioryctria sp.*	Pinyon pine,	Colorado	Scattered outbreaks of this shoot-infesting insect continue to plague pinyon pine throughout southwestern Colorado. These scattered outbreaks are expected to continue into 1993.
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Colorado, Wyoming	On the Shoshone National Forest in Wyoming, the epidemic continued to increase and spread on the Clarks Fork Ranger District. About 5,600 trees were killed in 1992, between Sunlight Basin and Crandell Ranger Station. The epidemic is expected to continue into 1993. Mortality along the Colorado Front Range continues occurring in small, widely scattered groups. Most mortality is on steep inaccessible slopes where western spruce budworm has defoliated trees over the past decade.
Elm calligrapha *Calligrapha scalaris*	Siberian elm	South Dakota	No significant activity reported in 1992.
Elm leaf beetle *Pyrrhalta luteola*	American elm, Siberian elm	Kansas, Nebraska, South Dakota	No significant activity reported in 1992.
European pine sawfly *Neodiprion sertifer*	Pine	Kansas	No significant activity reported in 1992.
Fall webworm *Hyphantria cunea*	Cottonwood	Colorado, Wyoming	Occasional tents of the fall webworm were observed on cottonwood in numerous drainages along the Colorado Front Range. Heavy defoliation noted in some sites.
Flea beetle *Altica* sp.	Cottonwood	Colorado	No significant activity reported in 1992.

INSECT	HOST	LOCATION	REMARKS
Gypsy moth *Lymantria dispar*	Hardwoods	Colorado, Nebraska, South Dakota, Wyoming	In South Dakota, seven moths were caught in delimitation and detection survey trapslocated south of Rapid City near Rockerville. No moths were detected in delimitation traps at a campground in Spearfish, SD, or in Tensleep Canyon on the Bighorn NF in Wyoming. Delimitation trapping of sites in Omaha, Nebraska, metropolitan area, where infested stock from Pennsylvania was inadvertently distributed in 1991, captured gypsy moths at two nurseries. Fifteen moths were caught adjacent to Fuccio's Nursery in Irvington, and one moth at Yan's Nursery. Single moth catches were found in delimitation traps at Ralston and Bellevue. No moths were caught in delimitation traps at Fremont and Weeping Water, Nebraska. Single moth catches also were found in detection traps located in Beatrice and North Platte, Nebraska. No moths were caught in traps placed in several locations, predominantly developed recreational sites on the Medicine Bow NF in Wyoming. In Colorado, surveys continue statewide on private lands. During 1992, a total of 2,090 detection traps were deployed. An additional 146 delimitation traps were placed surrounding the six positive 1991 trap sites. Please note an error in the 1991 Conditions report which states "no moths were caught in Colorado." A total of four moths were caught in 1992: one at Royal Gorge, one in Boulder, and two in Longmont (new location).
Hackberry galls *Pachypsylla celtidismamma* *P. celtidisversicula*	Hackberry	South Dakota	No significant activity reported in 1992.
Honeysuckle aphid *Hyadaphis tataricae*	Honeysuckle	South Dakota	No significant activity reported in 1992.

INSECT	HOST	LOCATION	REMARKS
Lilac borer *Podosesia syringae*	Green ash, Lilac	Nebraska, South Dakota	No significant activity reported in 1992.
Mountain pine beetle *Dendroctonus ponderosae*	Limber pine, Lodgepole pine, Ponderosa pine	Colorado, Dakota, Wyoming	Tree mortality increased significantly in the central Black Hills of South South Dakota, from 1991 to 1992. The epidemic near Bear Mountain spread to the south. Weather conditions significantly reduced the number of trees attacked in 1992 that will die in 1993. On the Bighorn NF in Wyoming, mortality of limber pine continued in Tensleep Canyon. The outbreak in ponderosa pine at Laramie Peak, WY, continues to decrease in 1992. However, the gross area affected is about 180,600 acres instead of the 11,000 acres mistakenly reported in 1990 and 1991. A small infestation was discovered in lodgepole pine near Lake Granby on the Arapaho NF. This continues at low levels throughout most of Colorado and appears to be declining in those areas which experienced fairly high populations during the late 1980's and early 1990's.
Pandora moth *Coloradia pandora*	Ponderosa pine	South Dakota	Populations were not apparent in 1992.
Pine engraver beetle *Ips pini*	Ponderosa pine, Lodgepole pine	South Dakota, Wyoming	Small pockets of top killing and tree mortality continued to be abundant in ponderosa pine, especially in the southern Black Hills in South Dakota. Beetle activity in lodgepole pine was still present in blowdown material that resulted from a spring microburst windstorm in 1991 and in salvage logs near the Tie Flume Campground area of the Bighorn NF. Pheromone traps were used in and around the campground to reduce spread of beetles to standing, green trees.

INSECT	HOST	LOCATION	REMARKS
Pine sawfly *Neodiprion autumnali*	Ponderosa pine	Nebraska, South Dakota, Wyoming	Outbreaks collapsed around the Black Hills of South Dakota following 2-3 years of heavy to severe defoliation in some areas. Defoliation occurred in pine stands along the northern Front Range west of Fort Collins. In some cases, some trees lost 80% of old needles. No mortality is expected.
Pine tip moths *Rhyacionia bushnelli*	Ponderosa pine	South Dakota	Damage continues to be abundant in regeneration in the central and southern Black Hills of South Dakota.
Pinyon pitch-nodule moth *Retinia arizonensis*	Pinyon pine	Colorado	No damage was reported in 1992.
Red turpentine beetle *Dendroctonus valens*	Jack pine, Ponderosa pine	Nebraska, South Dakota	Beetle attacks are common on stressed trees throughout the Black Hills of South Dakota and Wyoming. Populations appear to have declined from 1991 in areas with visible mechanical damage from harvesting equipment. Little tree mortality occurred. In Nebraska, beetles were commonly associated with Leptographium root disease in young jack pines; mortality was heavy in trees regenerated in patch clearcuts.
Roundheaded pine beetle *Dendroctonus approximatus*	Ponderosa pine	Colorado	This insect was commonly found on the Uncompahgre Plateau in conjunction with mountain pine beetle and western pine beetle -- usually infesting the same trees.
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Colorado, Wyoming	A small infestation in standing trees was discovered on the Routt National Forest in Colorado, and was subsequently salvage logged. The population had developed in road right-of-way log decks. Monitoring was conducted on several proposed and existing timber sales in southwestern Colorado. In Wyoming, population levels were low.

INSECT	HOST	LOCATION	REMARKS
Tent caterpillars *Malacosoma americanum* *M. californicum* *M. disstria*	Chokecherry, Hardwoods, American plum	South Dakota	Defoliation was heavy in wooded draws in the Black Hills of South Dakota and Wyoming.
Twig beetles *Pityophthorus* sp.	Pinyon pine	Colorado	Twig beetles in association with dioryctria moths are causing mortality and branch dieback in Southern Colorado.
Ugly nest caterpillar *Archips cerasivoranus*	Chokecherry	South Dakota	No significant activity reported in 1992.
Walnut caterpillar *Datana integerrima*	Pecan, Walnut	Kansas	No significant activity reported in 1992.
Web-spinning sawflies *Acantholyda* sp., *Cephalcia* sp.	Ponderosa pine, Engelmann spruce	Colorado	Detected in northwestern Colorado. Some may be new species in Colorado pending further identification. Damage generally minor, but some trees experienced 25% defoliation and numerous unsightly web nests.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Colorado	No significant activity reported in 1992.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, Engelmann spruce, White fir	Colorado, Wyoming	Approximately 262,000 acres of mixed conifer and subalpine forests were visibly defoliated in the Gunnison zone in 1992. This was a significant decrease from the 400,000 acres reported in 1991. The defoliation occurred on the San Isabel, Rio Grande, Gunnison, and White River National Forests, as well as on private land in Gunnison County. The activity in these areas is expected to continue into 1993. Areas along the Front Range on the Pike NF and adjacent intermingled state and private lands experienced moderate defoliation. In the Lake City area, a total of 4,791 acres of private land were aerially sprayed in June (520 acres with Bt, 4,271 with carbaryl). Defoliation was light in other areas of the state. In Wyoming, areas near Sunlight Basin on the Shoshone NF and near Lander were lightly defoliated in 1992.

Rocky Mountain Region-Status of Insects in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

INSECT	HOST	LOCATION	REMARKS
White pine weevil *Pissodes strobi*	Colorado blue spruce	Colorado	White pine weevil damage to spruce leaders continued at a static level in south and central Colorado.

ROCKY MOUNTAIN REGION DISEASES

Prepared by William H. Blunt

DISEASE	HOST	LOCATION	REMARKS
STEM AND BRANCH DISEASES			
Ash heartrot *Perebbuoirua fraxinophola*	Green ash	South Dakota	No significant activity reported in 1992.
Aspen trunk rot *Phellinus tremulae*	Aspen	South Dakota	Heartwood decay due to this rot is wide-spread throughout aspen stands in the Black Hills NF.
Black knot *Apiosporina morbosum*	Chokecherry	Colorado	Cherry in riparian zones are commonly affected by this disease throughout Colorado.
Comandra blister rust *Cronartium comandrae*	Lodgepole pine	Colorado, Wyoming	Continues as one of the major diseases on the Bighorn and Medicine Bow National Forests, WY. It is a particular management concern along the eastern edge of the Medicine Bow NF adjacent to sagebrush habitat containing the alternate host, *Comandra* spp. Damage was scattered in older lodgepole stands on the Shoshone National Forest. The disease is present in northern Colorado and western South Dakota but causes no significant damage.

Rocky Mountain Region-Status of Disease in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

DISEASE	HOST	LOCATION	REMARKS
Dwarf mistletoes *Arceuthobium americanum*	Lodgepole pine	Colorado, Wyoming	Dwarf mistletoes cause the greatest disease losses in Region 2. Losses equal at least 10 million cu. ft. annually. In Colorado, 50% of the lodgepole pine type is infected. Forest Health Management funded presuppression surveys on 14,711 acres on five National Forests and silvicultural control on 1,284 acres on five National Forests. In addition, 4,500 acres of Department of Interior lands were surveyed and 325 acres were treated. Continuing emphasis is being placed on suppression projects in developed recreation sites. It is widespread in some areas of the Bighorn NF, though not yet a management concern.
Arceuthobium douglasii	Douglas-fir	Colorado	Occurs mostly in the southern two-thirds of the State. No suppression projects were funded by Forest Pest Management in 1992.
Arceuthobium vaginatum subsp. cryptopodium	Ponderosa pine	Colorado	Losses amount to 885,000 cu. ft. annually. Suppression projects emphasized tree removal and pruning of infected trees in developed recreation sites. The disease continued to be a factor affecting management on the southern Ute Reservation in southern Colorado.
Arceuthobium divaricatum	Pinyon pine	Colorado	Pinyon pine dwarf mistletoe continued as a minor problem in western Colorado.
Fir broom rust *Melampsorella Caryophyllacearum*	Ponderosa pine	Wyoming	Brooms scattered on older subalpine fir in the Bighorn NF.
Fir trunk rot *Phellinus pini*	Subalpine fir	Wyoming	Decay and possible mortality due to this pathogen were reported for the first time on old-growth subalpine fir in the Bighorn NF.
Poplar shoot blight *Venturia macularis*	Aspen	Colorado	Common on aspen regeneration in many locations in Colorado.

DISEASE	HOST	LOCATION	REMARKS
Red ray rot *Dichomitus squalens*	Ponderosa pine	South Dakota	Heartwood decay is widespread in mature ponderosa pine on the Black Hills NF.
Red ring rot *Phellinus pini*	Ponderosa pine	Wyoming	Heartwood decay due to this fungus appears to be common in mature fir stands on the Bighorn NF.
Spruce broom rust *Chrysomyxa arctostaphyli*	Black Hills	South Dakota	Brooms scattered throughout spruce on the Black Hills NF. Effect on growth and regeneration of spruce unknown.
Western gall rust *Endocronartium harknessii*	Lodgepole pine, Ponderosa pine	Colorado, Nebraska, South Dakota, Wyoming	Western gall rust is present at moderate to severe levels in lodgepole pine near the Norrie Colony on the White River NF in Colorado. There was no increase in activity during 1992 in Nebraska, South Dakota, and Wyoming.
White pine blister rust *Cronartium ribicola*	Limber pine	Wyoming, South Dakota	Branch mortality continued at several locations in the Bighorn NF. The disease is present at a remote stand in the Black Hills of South Dakota. Infected trees have been found in isolated stands.
CANKER DISEASES			
Botryodiplodia *Botryodiplodia* sp.	Juniper	Kansas	No significant activity reported in 1992.
Botryosphaeria *Botryosphaeria stevensii*	Eastern redcedar, Rocky Mt. juniper	Kansas, Nebraska	No significant activity reported in 1992
Cytospora canker *Cytospora* spp.	Aspen, poplars, other hardwoods	Colorado	This disease is common on aspen throughout Colorado where it is a management concern in campgrounds and in regeneration areas. Lombardy poplars continue to die from this disease 10-20 years after planting. Widespread on many other hosts, probably as a result of the October 1991 freeze and other stresses, such as the mild, dry winter of 1991-92.

Rocky Mountain Region-Status of Disease in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

DISEASE	HOST	LOCATION	REMARKS
Cytospora canker *Cytospora* spp.	Aspen	South Dakota	It is widespread on aspen in the Black Hills, generally on trees weakened by other diseases and/or insects.
Cryptosphaeria canker *Cryptosphaeria populina*	Aspen	South Dakota	Patches of mortality in young aspen on the Pactola Ranger District of the Black Hills NF may have been caused by this organism. This is the first report of the canker contributing to significant aspen mortality in the Black Hills.
Grovesiella canker *Grovesiella abietina*	Subalpine fir	Wyoming	This canker was reported for the first time causing mortality of leaders and branches of young subalpine fir in the understory. It is not causing mortality of young trees, but may be slowing their growth.
Russian olive canker *Phomopsis sp.,* *Tubercularia sp.* or *Lasiodiplodia* sp.	Russian olive	Kansas, Nebraska, South Dakota, Wyoming	Status not noted to be different than reported in 1991.
Siberian elm canker *Botryodiplodia hypoderma* *Tubercularia ulmea*	Siberian elm	Colorado, Nebraska, South Dakota, Wyoming	Status not noted to be different than reported in 1991.
Sooty bark canker *Encoelia pruinosa*	Aspen	Colorado	Sooty bark canker is a common disease in aspen stands throughout Colorado.
Thyronectria canker *Thyronectria austro-americana*	Honeylocust	Colorado	Shade trees in Colorado were affected in large numbers in 1992, probably as a result of previously weakened condition.
ROOT DISEASES			
Annosus root disease *Heterobasidion annosum*	Ponderosa pine, White fir	Colorado, Nebraska	The disease was reported as a factor affecting management of mixed conifer stands on the Southern Ute Reservation and in white fir in the Amphitheater Campground on the Uncompahgre NF. The disease was also noted in the spruce/fir stands at the North Cone and Truby Complex Timber Sale Areas on the Uncompahgre and San Juan NFs.

Rocky Mountain Region-Status of Disease in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

DISEASE	HOST	LOCATION	REMARKS
Armillaria root disease Armillaria spp.	Engelmann spruce, Lodgepole pine, Ponderosa pine, Subalpine fir, White fir	Colorado, South Dakota, Wyoming	In South Dakota, this root disease continues to cause mortality of spruce and ponderosa pine on the Black Hills NF. Large volume losses and poor regeneration of ponderosa pine are occurring in the northern Hills. Impact of the disease in the southern Hills is yet to be determined. *Armillaria* root disease is the most common root disease in Colorado. The disease is affecting management of mixed conifer stands on the Southern Ute Reservation and is present in the spruce/fir stands at the North Cone and Truby Complex Timber Sale Areas on the Uncompahgre and San Juan NFs and in the Willow Peak and Grizzly Lake areas of the Flat Tops (Eagle Ranger District), White River NF. The disease was also identified as a major problem in the spruce/fir leave strips at the Aspen Mountain ski area. Assessments of Armillaria root disease impacts were carried out in regenerating lodgepole pine stands on the Alpine Plateau, west of Gunnison, and near Horseshoe Campground on the Arapaho NF.
Black stain root disease *Leptographium wageneri*	Pinyon pine, Ponderosa pine	Colorado	Continues to occur on ponderosa pine in interior portions of Colorado and on pinyon pine in the southwestern corner of the state.
White mottled rot *Ganoderma applanatum*	Aspen	Colorado	Reported as a potential hazard at the Woods Lake Campground in the Telluride Skyway area (currently under the jurisdiction of the Colorado Department of Wildlife).
FOLIAGE DISEASES			
Anthracnose *Gnomonia leptostyla*	Walnut	Kansas	No activity reported in 1992.
Apiognomonia veneta (=*Gnomonia platani*)	Sycamore	Colorado, Kansas, Wyoming	No activity reported in 1992.

DISEASE	HOST	LOCATION	REMARKS
Ash rust *Puccinia sparganioides*	Green ash	Kansas, Nebraska, South Dakota	No activity reported in 1992.
Aspen leaf blights *Ciborinia whetzelli* *Marssonina populi*	Aspen	Colorado, South Dakota	Found throughout the aspen type, these diseases create great aesthetic concern. In 1992, incidence and severity of these diseases throughout Colorado remained low.
Black spot needle blight *Scirrhia acicola*	Scots pine	Kansas,	No significant activity reported in 1992.
Brown spot needle blight *Scirrhia acicola*	Scots pine	Kansas, Nebraska	No activity reported in 1992.
Cedar apple rust *Gymnosporangium juniperi-virginianae*	Apple species, Eastern redcedar	Colorado, Kansas, Nebraska, South Dakota, Wyoming	No activity reported in 1992.
Cercospora blight of juniper *Cercospora sequoiae*	Eastern redcedar, Rocky Mt. juniper.	Nebraska, South Dakota	No activiy reported in 1992.
Conifer-aspen rust *Melampsora medusae*	Aspen	Colorado	Like the aspen foliage diseases above, conifer-aspen rust causes great aesthetic concern but little permanent damage to the host trees. Moderate disease levels were noted throughout the state.
Diplodia blight *Sphaeropsis sapinea (=Diplodia pinea)*	Ponderosa pine	South Dakota	Damage appeared higher in the Black Hills than in recent years, probably due to a wet spring and several severe hailstorms.
Dothistroma needle blight *Scirrhia pini*	Austrian pine	Nebraska	No activity reported in 1992.
Elytroderma needle cast *Elytroderma deformans*	Ponderosa pine	South Dakota	Continues to be found in low levels in the Black Hills NF.
Fire blight *Erwinia amylovora*	Apple species, Cotoneaster, Crabapple	Colorado, South Dakota, Wyoming	No activity reported in 1992.

Rocky Mountain Region-Status of Disease in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

DISEASE	HOST	LOCATION	REMARKS
Ink spot *Ciborina whetzelii*	Aspen	Colorado	Moderate to severe damage on aspen in western and southwestern portions of the state in 1992.
Leaf shothole *Cylindrosporium* sp.	Black cherry, Chokecherry	Nebraska, South Dakota	No activity reported in 1992.
Marssonina blight *Marssonina populi*	Aspen	Colorado, South Dakota	Widespread on the Routt NF in north-western Colorado due to abnormally cool, wet weather.
Melampsora leaf rust *Melampsora medusae*	Aspen	Colorado, South Dakota	Common in west slope stands of the central Front Range in Colorado. Foliage discoloration was evident in pockets in the central Black Hills in late summer. Incidence of the rust was less than in 1991.
Needle casts *Lophodermella concolor* *Lophodermella montivaga*	Lodgepole pine	Colorado	Noted in northcentral Colorado and southern Wyoming due to abnormally cool, wet weather.
Phomopsis blight *Phomopsis juniperovora*	E. redcedar, Rocky Mtn. juniper	Nebraska	Present in beds at Bessey Nursery, but at much lower levels than in previous years.
Septoria leaf spot *Septoria caraganae*	Caragana	South Dakota	No activity reported in 1992.
VASCULAR WILTS AND DECLINES			
Ash decline	Green ash	Colorado	No activity reported in 1992.
Dutch elm disease *Ceratocystis ulmi*	Elm species	Colorado	Incidence was down in 1992, but an increased number of similar appearing symptoms resulting from the freeze damage of October 1991.
Oak wilt *Ceratocystis fagacearum*	Oak species	Kansas, Nebraska	No activity reported in 1992.
Pine wood nematode *Bursaphelenchus xylophilus*	Scots pine	Kansas, Nebraska	No activity reported in 1992.

Rocky Mountain Region-Status of Disease in Colorado, Kansas, Nebraska, South Dakota, and central and eastern Wyoming.

DISEASE	HOST	LOCATION	REMARKS
ABIOTIC			
Chemical damage	Many hardwood species	Colorado, Kansas, Nebraska, South Dakota, Wyoming	No significant activity reported in 1992.
Cottonwood mortality	Cottonwood	Colorado	Locally severe loss of cottonwoods along the Poudre River near Ft. Collins, CO, as a result of re-routing of the river channel and decreased available water supply to roots.
Drought, other unknown agents	Dogwood, Black walnut, Blue spruce, Buffaloberry, Green ash, Pear, Ponderosa pine, Poplar, Russian olive, Siberian elm, Silver maple	Colorado, Nebraska, South Dakota, Wyoming	No significant activity reported in 1992.
Frost damage	Hardwoods	South Dakota	No significant activity reported in 1992.
High water	Ponderosa pine	Colorado	No significant activity reported in 1992.
Winter drying injury	Lodgepole pine, Ponderosa pine	Wyoming, South Dakota	Widespread needle damage occurred in areas of the Bighorn NF on lodgepole pine. Widespread winter flecking seems to be occurring on the easternmost natural populations of ponderosa pine in South Dakota.
Winter injury	Hardwoods	Colorado	Significant loss in metropolitan and urban areas in eastern Colorado and southern Wyoming due to seasonally low temperatures that occurred in October 1991 before trees hardened-off. Siberian elm particularly affected. Other species included willows, poplars, and cherry trees. A conservative estimate of mortality is more than one million trees.

DISEASE	HOST	LOCATION	REMARKS
OTHER			
Hail damage	Aspen	Colorado	Localized damage was observed near Opal Lake, Pagosa Ranger District, San Juan NF.
Porcupine feeding	Ponderosa pine	South Dakota	Porcupine feeding damage was observed in association with comandra blister rust stem cankers on ponderosa pine in the Black Hills NF, and feeding damage was also found to be extensive in patches of young regenerating pine stands.
Sprout dieback	Aspen	Colorado	Examples of regeneration failure and dieback may be found on the Grand Mesa, Uncompahgre, Gunnison, San Juan and Routt NFs. Snow damage, dry sites, wet sites, herbivore pressure, competing understory, soil evolution, and disease may be variously involved.
Squirrel damage	Hackberry, Honeylocust, Maples, Ponderosa pine, Russian olive, Siberian elm	South Dakota	No significant activity reported in 1992.

Figure A

Data for acres affected by mountain pine beetle and western spruce budworm (Figures A & B) were developed from aerial surveys together with ground reconnaissance.

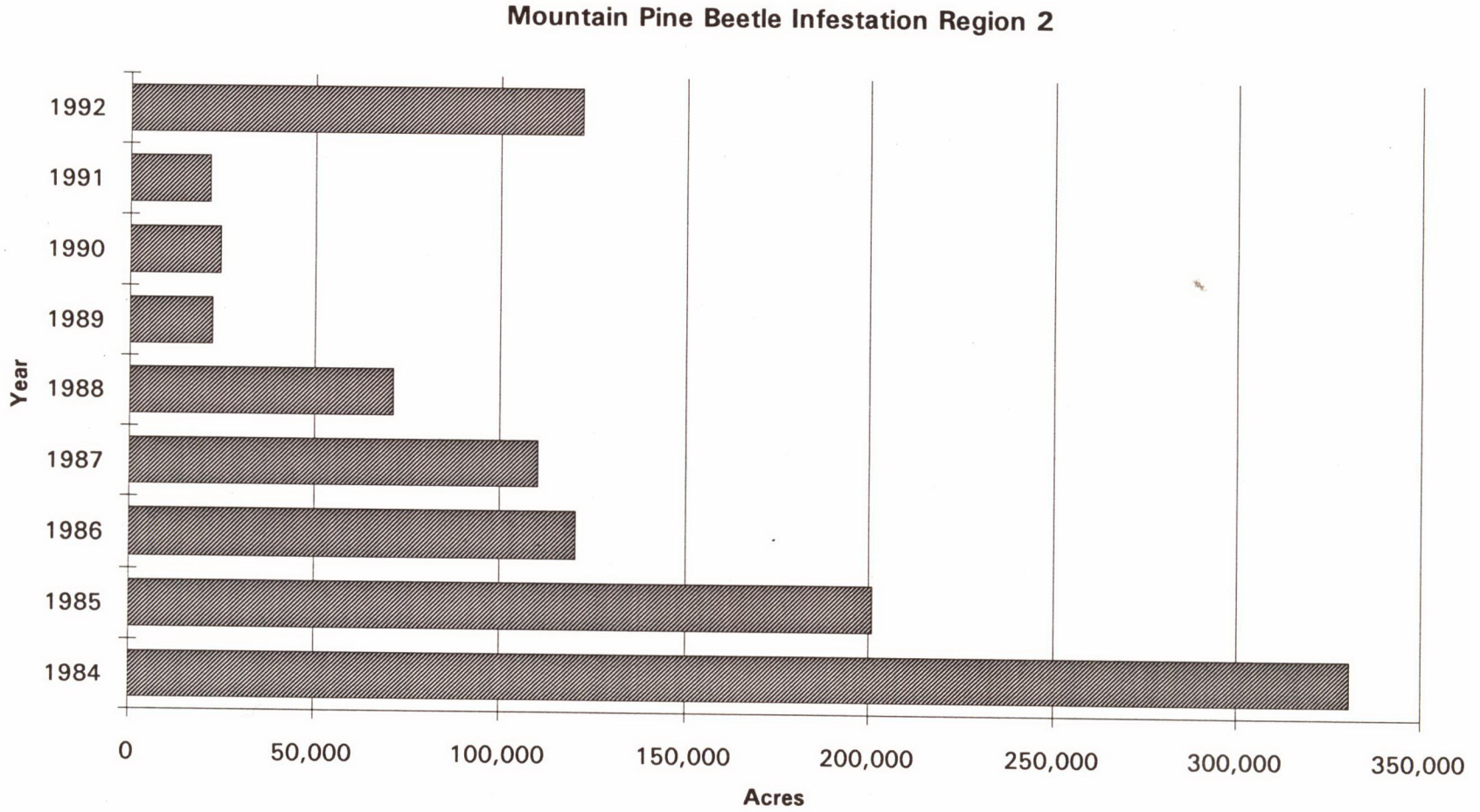
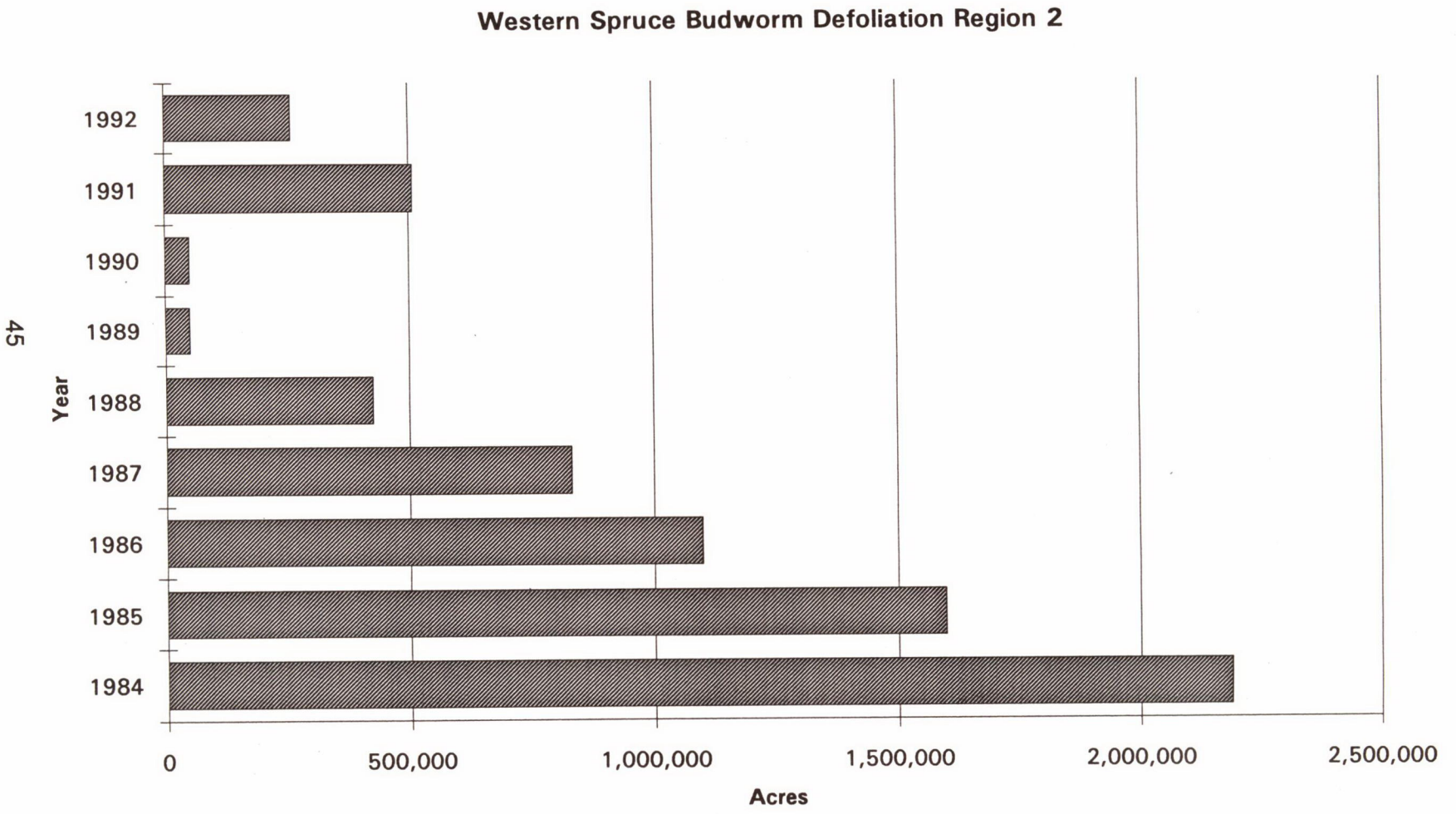


Figure B


Western Spruce Budworm Defoliation Region 2
1992
1991
1990
1989
1988
1987
1986
1985
1984
Year
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
Acres

PESTICIDE USE in REGION 2 in FY 92 2/

Type of Pesticide	Chemical Used	Target Pest	Units Treated 2/
Fumigant	Dazomet	Nematodes Fusarium Brown Spot Needle Blight Damping-off	12
	Methyl Bromide/ Chloropicrin	Nematodes Fusarium Brown spot Needle Blight Damping-off	12
Fungicide	Benefin Benomyl	Rights-of-way Phomopsis Scleroderris	1 10
	Dodine	Shot Hole Disease	5
	Thiophanate	Phomopsis Scleroderris	30
	Zineb	Lophodermium- Needle Blight Scleroderris	1
Herbicide	Bromacil	General weeds	2
	Bromacil/Diuron	General weeds	205
	Chlorosulfuron	Noxious weeds	116
	Clopyralid	Noxious weeds	221
	Chlorthal- dimethyl	Nursery weeds	37
	Dicamba	Noxious weeds	569
	Diuron	Noxious weeds	6
	Glyphosate	Noxious weeds	241
	Hexazinone	Site preparation	26
	Imazapyr	Undesirable- vegetation	1
	Metasulfuron	Noxious weeds	45

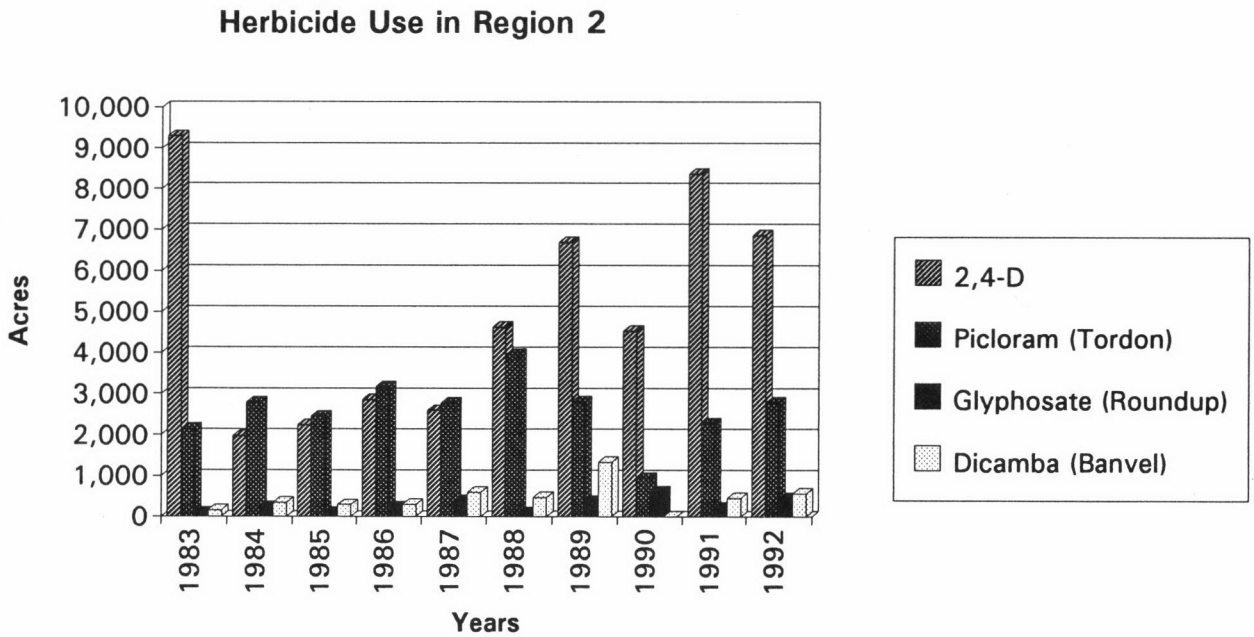
	Methyl Oxyfluorfen	Nursery weeds	1
	Picloram	Noxious weeds	2792
	Prometon	Canada Thistle Gambel oak	1
	Quinclorac	Research	0.1
	Sulfometuron Methyl	General weeds	2
	Tebuthiuron	Range Improvement	75
	2,4-D	Noxious weeds	595
	2,4-D amine	Noxious weeds	775
	2,4-D/Clopyralid	Noxious weeds	141
	2,4-D/Dicamba 2,4-DPicloram	Noxious weeds Noxious weeds	500 4852
Insecticide	Carbaryl	Aphids Grasshoppers Leaf beetles MPB	22
	Coumaphos	Miscellaneous (Cattle) insects, ticks, lice & mites	15800
	Dimethoate	Tip Moths	22
Rodenticide	Aluminum phosphide	Prairie dogs	5

1/ Includes use by the USDA Forest Service, other federal agencies, permittees, licensees, and grantees.

2/ Units are in acres unless otherwise indicated.

PESTICIDE USE

While our knowledge of biological control is developing, the use of pesticides continues as an important part of Forest Health Management. Pesticides are valuable tools in management of noxious weeds and undesirable vegetation in range management and in forest ree nursery management. The following graph shows hericide use trends for the past 8 years. The major target species in the graph are the sagebrushes, thistles, leafy spruge, and various broadleaf weeds for range improvement and roadside management projects.



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(as of June 1993)

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